FOREST GOVERNANCE AND GLOBAL DEVELOPMENT: THE LAND SPARING FALLACY IN BRAZIL AND INDONESIA

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Gregory Massey Thaler

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FOREST GOVERNANCE AND GLOBAL DEVELOPMENT: THE LAND SPARING FALLACY IN BRAZIL AND INDONESIA

Gregory Massey Thaler, Ph. D.

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Tropical deforestation in Brazil and Indonesia is central to global trends of climate change, biodiversity loss, and agro-industrial expansion. Since 2004, new governance measures in Brazil have helped reduce deforestation in the Amazon by nearly 80 percent. Similar governance measures in Indonesia have failed to slow forest clearing, however. I explain this divergence through a comparative and ethnographic study focused on the programs of The Nature Conservancy (TNC), an international environmental organization. I conducted six municipal-level case studies of TNC projects and an organizational ethnography of TNC's tropical forest programs, including 181 key-informant interviews and analysis of socio-economic and environmental datasets. I find that forest governance strategies in Brazil and Indonesia are strongly influenced by the 'land sparing hypothesis,' which holds that increasing agricultural productivity can spare land for conservation. In Brazil, government, corporate, and non-governmental actors have reduced deforestation through a land sparing model that links forest conservation to agricultural intensification, state-building, and socio-economic development. In Indonesia, by contrast, land sparing efforts have been stymied by government and corporate actors who extract resources for private gain. Overall, I show that deforestation reductions in Brazil favor agro-industry over small farmers, however, and are mostly canceled out by displacement of deforestation to extractive zones like Indonesia. I therefore argue that the land sparing model is a fallacy: it supports industrial expansion and state-building but displaces social and environmental degradation, producing negative global outcomes.

BIOGRAPHICAL SKETCH

Gregory M. Thaler received his MA in Government from Cornell University in 2013 and his BA in Political Science from Yale University in 2007. Prior to beginning the PhD program at Cornell, he was a UNESCO-Fulbright Fellow and consultant with UNESCO's Man and the Biosphere (MAB) Programme, a Fulbright Grantee in Ecuador, and an apprentice on an organic, community-supported farm in his home state of Maine.

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PART I

CHAPTER 1

INTRODUCTION

Tropical humid forests are popular with environmentalists. Indeed, the environmentalist focus on this biome is so strong that 'saving the rainforest' has become a byword for 'saving the planet.' When I was in third grade, we raised money in school to 'buy' acres of rainforest, spurred on by images of charismatic animals, exotic indigenous people, and a tropical Eden in flames. The immense biological and human diversity of tropical forest regions, and now also the immense quantities of carbon stored in tropical forest biomass, have fixated the environmentalist movement that emerged in the 1960s and '70s. This fascination with humid tropical forests stretches back to the beginnings of modern environmentalism in the colonial era, however, when the ecological devastation of tropical islands by colonial extraction inflamed the European imagination as a harbinger that human beings, driven by commercial interests, might destroy the global environment and extinguish the human species (Grove 1995).

Tropical forest conservation has thus been a cornerstone of Western environmentalist concern, from 18th-century colonial forest reserves to contemporary forest carbon markets. Nonetheless, the global march of tropical deforestation has not just continued, but accelerated dramatically at the dawn of the 21st century (Hansen et al. 2013; Kim, Sexton, and Townshend 2015), even as concern over the role of deforestation in global climate change has made forest conservation appear all the more critical. This dissertation is a study of tropical forest conservation policy and tropical land use change focused on the period from 1990 to the present. I explore the causes and mechanisms through which forest policies in some places appear to have been effective

in reducing deforestation, and I explain why, despite regional conservation successes, overall tropical forest loss has increased.

The importance of tropical deforestation extends far beyond the critical concerns of biodiversity loss, climate change, and the extinction or transformation of local human cultures and livelihoods. Deforested tropical lands are primarily converted to agriculture (M. Williams 2006; Ramankutty and Foley 1999; Sy et al. 2015),[1] and these former forestlands have been the primary locations of tropical agricultural expansion in recent decades (Gibbs et al. 2010). In the deforestation hotspots of Latin America and Southeast Asia, forest loss since the 1980s has increasingly been driven by industrial agribusiness production linked to global markets (Rudel, DeFries, et al. 2009). This close relationship between forest loss and agro-industrial expansion places tropical deforestation at the center of debates about the relationship between environment and development.

Can capitalist socio-economic development be ecologically sustainable? Or does capitalist growth necessarily degrade the environment? Neo-Malthusian critiques of growth, such as Ehrlich's (1968) *The Population Bomb* and The Club of Rome's report on "The Limits to Growth" (Meadows et al. 1972), permeated the Northern environmental movement of the 1960s and early 1970s. The idea that economic development and environmental protection were irreconcilable created divisions between Global North and Global South that were highlighted at the 1972 UN Conference on the Human Environment in Stockholm, where developing countries argued that concern for the environment was a luxury of the rich. During the 1970s, environmentalists began to move away from this tradeoffs perspective, transitioning to an ecological modernization paradigm of 'sustainable development' that seeks synergies between economic development and

[1] Agriculture refers to both producing crops and raising livestock.

environmental protection (Hajer 1995; Lee, Ferraro, and Barrett 2001). The relationship between tropical deforestation and agro-industrial expansion cuts to the heart of the environment and development question. Is deforestation necessary for the national development of tropical countries? Or is it possible to decouple agricultural productivity from forest clearing so that forest conservation and economic growth can coexist? The answers to these questions have profound implications for our understanding of the political economy of natural resources and development and the limits of possibility of our capitalist world-ecology. These are precisely the questions this dissertation seeks to answer.

My study begins with a puzzling divergence. Brazil and Indonesia are the two primary hotspots of tropical deforestation. Together they contain 36 percent of remaining humid tropical forest, and they are responsible for roughly 60 percent of all humid tropical forest clearing (Hansen et al. 2008; Hansen et al. 2013). From the 1970s through the early 2000s, deforestation in these two countries followed a similar pattern. From the 1960s into the 1980s, deforestation was driven primarily by smallholder colonization in Brazil and by state-supported migration programs and logging operations in Indonesia. From the 1980s onwards, the main drivers of deforestation shifted in both countries towards industrial logging and agribusiness, especially ranching and field agriculture in Brazil and oil palm and tree fiber plantations in Indonesia (Rudel 2007; Rudel, DeFries, et al. 2009).

In 2004, however, something changed. Primary forest cover loss in the Brazilian Amazon declined over 80 percent after 2004, while deforestation in Indonesia accelerated, to the point where in 2012, Indonesia exceeded Brazil as the country with the highest annual rate of primary tropical forest loss (Figure 1.1). Since that time, Indonesia has maintained elevated deforestation

rates, while deforestation in the Brazilian Amazon has remained more than 70 percent below its 2004 peak.

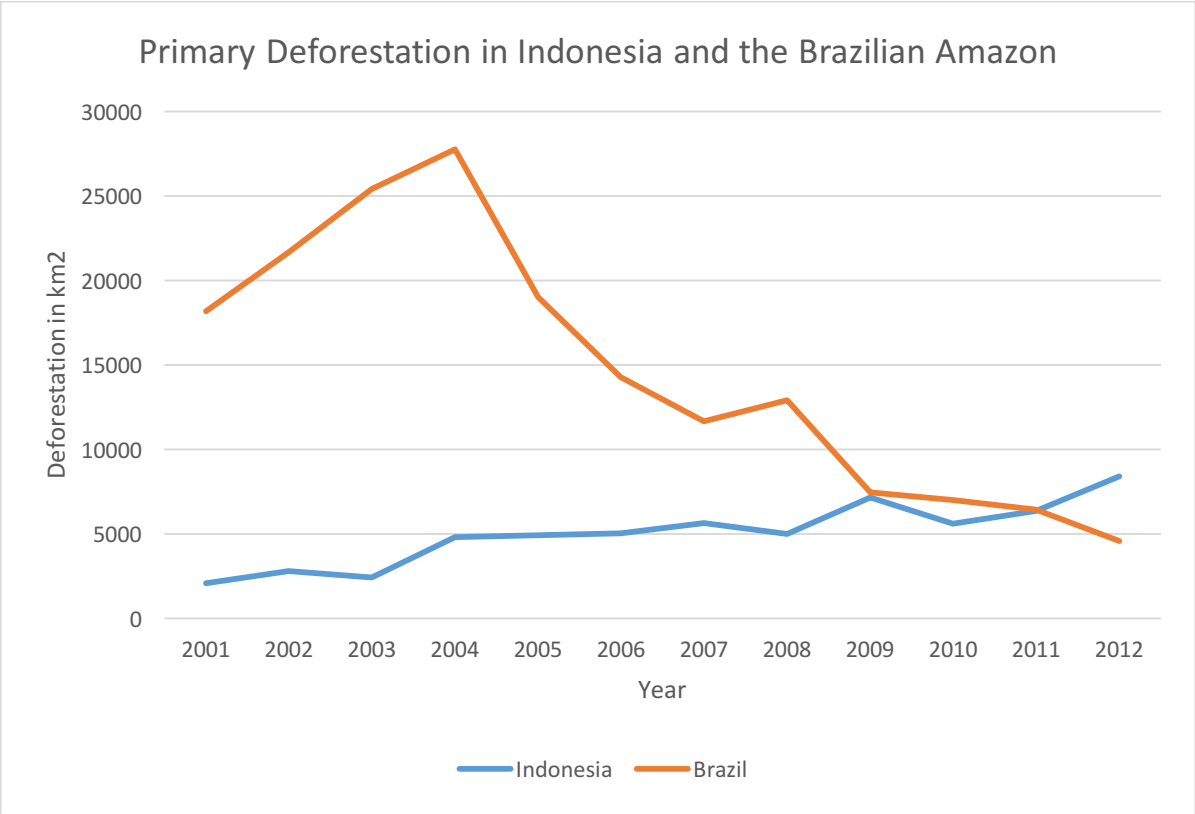


Figure 1.1: Primary Deforestation in Indonesia and the Brazilian Amazon. Data from Margono et al. (2014) and INPE (2017).

While there are many different drivers of tropical deforestation, including climate and macroeconomic conditions, there is universal agreement among researchers, politicians, and farmers and ranchers that reductions in Amazonian deforestation have been driven substantially by new governance measures. These governance measures have included industry moratoria on purchasing soy and cattle from deforested areas, commodity sustainability roundtables, expansion of protected areas, and enhanced deforestation monitoring, and they have succeeded in reducing deforestation in the Brazilian Amazon even as agricultural production in the region increased. Yet

similar governance measures in Indonesia, such as the Roundtable on Sustainable Palm Oil and a moratorium on new industrial concessions in primary forest areas, have failed to reduce deforestation.

I set out to explain this divergence: why have forest conservation policies failed to slow deforestation in Indonesia, how have policies reduced deforestation in Brazil, and what does Brazil's success say about the possibility of reconciling environmental protection with agro-industrial development?

'Development,' Conflicts, and Institutions

The science of human-environment interactions, or 'socio-ecological systems,' is complex and inherently interdisciplinary. With regard to the role of policy in shaping socio-ecological change, there are three bodies of literature that offer different intuitions to explain divergent deforestation trajectories in Indonesia and Brazil.

The first is the literature on the political economy of natural resources and development, within which there is a large body of work linked to socio-environmental modernization theories. 'Modernization' as a theory of socio-economic development achieved prominence in the post-World War II period of rapid urbanization, industrialization, technological innovation, and anti-Communist sentiment. Modernization theories posit a teleological socio-economic evolution towards industrial consumer capitalism, exemplified by Rostow's (1960) 'stages of growth.' In relation to the environment, the modernization narrative has been complemented by "modernization-based environmental social theories" (Perz 2007) such as the environmental Kuznets curve hypothesis, forest transition theory, and ecological modernization theory. These socio-environmental modernization theories all maintain that environmental destruction (such as

deforestation) worsens at earlier stages of socio-economic development and then improves at higher levels of development.

The environmental Kuznets curve (EKC) hypothesis holds that there exists an inverted U-shaped relationship between income and environmental degradation, analogous to the inverted U relationship between inequality and income levels posited by Simon Kuznets (1955). For Kuznets, the inequalities generated by earlier stages of capitalist development should resolve at higher levels of development into more egalitarian, rich societies. In the environmental version of the Kuznets curve, a country will experience increasing environmental degradation in the early stages of development until a certain turning point is reached, beyond which increased income is associated with improving environmental conditions

Numerous studies in the 1990s presented evidence for the existence of an EKC,[2] often based on cross-national statistical regressions. Critics charged that these studies employed inappropriate and simplistic econometric methods, and when proper techniques were used, the EKC disappeared (Stern 2004). Much of the EKC literature dealt with emissions of pollutants such as sulfur dioxide, but a number of studies also offer evidence of an EKC for deforestation (Bhattarai and Hammig 2001; Ehrhardt-Martinez, Crenshaw, and Jenkins 2002; Marquart-Pyatt 2004; Culas 2007). The idea of an environmental Kuznets curve for deforestation is closely linked to the idea of a forest transition curve.

Forest transition theory is based on the observation that in a number of places historical declines in forest area have been followed by gradual reforestation (Mather 1992; Mather and Needle 1998; Rudel et al. 2005; Kauppi et al. 2006). As with the EKC literature, many forest

[2] The World Bank's 1992 World Development Report (World Bank 1992) played a key role in popularizing the EKC hypothesis. For reviews of the 1990s EKC literature, see Stern, Common, and Barbier (1996) and Stern (2004).

transition analyses focus at the national level (Mather, Fairbairn, and Needle 1999; Kauppi et al. 2006; Meyfroidt, Rudel, and Lambin 2010). The theory suggests that reversals in deforestation may occur as a result of processes of economic development or in reaction to forest scarcity (Rudel et al. 2005; Angelsen 2010). An early explanation for forest transitions held that as agriculture in an area matured, it became concentrated on higher-quality land, leaving poorer land areas open for reforestation (Mather and Needle 1998). This explanation has been elaborated to suggest that as an economy develops and better-paying non-farm jobs become available, agricultural labor costs rise, leading to the abandonment of less-productive fields – a process that Rudel et al. (2005) label the 'economic development path' to the forest transition.[3] A second explanation for the forest transition is the 'forest scarcity path,' where declines in forest cover raise the price of forest products and services to the point where landowners begin to reforest their land (Rudel et al. 2005). Both of these paths ascribe forest transitions to a simple economic rationality: agricultural rents may decline, forest rents may increase, and over time and concurrent with economic development, the relative rent to forest conversion is altered in favor of reforestation.

Forest transition theory and the EKC hypothesis complement the broader perspective of ecological modernization theory, which maintains that capitalist economies reform as they modernize in order to address environmental problems (Spaargaren and Mol 1992; Mol 1996; Murphy 2000).[4] The mechanisms through which 'modernization' or increasing income might lead to improving environmental quality are disputed. Some scholars favor technological and structural

[3] Other factors such as technological change might equally lead to agricultural intensification and land sparing for reforestation (Rudel, Schneider, et al. 2009); increasing off-farm employment is the mechanism endogenous to industrial development.

[4] There is a distinction between ecological modernization *theory*, which is the body of scientific research that argues that ecological modernization is an empirical regularity and seeks to study it (cf. Murphy 2000), and ecological modernization *discourse*, which advocates ecological modernization as possible, desirable, and perhaps inevitable (Hajer 1995). Unless specifically referencing ecological modernization theory, I primarily use the term 'ecological modernization' to refer to the broader discourse, which receives further treatment in Chapters 3 and 4.

explanations, such as the economic development and forest scarcity paths of forest transition theory, and others highlight political and institutional factors such as the effects of improved property rights and governance quality (Panayotou 1997; Mol 2000; Ehrhardt-Martinez, Crenshaw, and Jenkins 2002).

In the broadest terms, the socio-environmental modernization perspective suggests that divergent patterns of deforestation between Brazil and Indonesia should be explained by 'development,' locating the countries at different points on a modernization curve.

A second body of literature comes from the field of political ecology. Political ecology is a diverse field that seeks to understand socio-ecological relations through an integration of ecology with political economy (Blaikie and Brookfield 1987; Watts and Peet 2004). Especially apt is Martínez-Alier's characterization of political ecology as the study of "ecological distribution conflicts" (Martínez-Alier 2002). Political ecology scholarship, such as the work of Susanna Hecht and Marianne Schmink in the Amazon (Hecht and Cockburn 1989; Schmink and Wood 1992) and Tania Li and Nancy Peluso in Indonesia (Li 2002; Li 2014; Peluso 1992a; Peluso, Afiff, and Rachman 2008), examines how patterns of resource use and access structure and are structured by processes of political-economic contestation. Hecht, for example, locates Brazilian deforestation reductions in "[n]ew institutional framings, ideologies, political decentralization, globalizations and an expanded arena for new social movements and civil society" (Hecht 2011, 4), arguing that "[c]hanging deforestation patterns, the product and the point of policy and institutional innovations[,] were informed by deep interdisciplinarities [of a diversity of environmentalisms], rather than [being] an ancillary 'by product' of modernization" (Hecht 2011, 14). As Peluso points out, political ecology is an approach rather than a specific theoretical frame (Peluso 1992b). The political ecology approach, then, would focus on how the conditions and contestation of resource

use and access may differ in Brazil and Indonesia to influence the outcomes of conflicts around deforestation.

Third, there is a large literature on global environmental governance, including especially scholarship on multi-level governance of complex resource systems, which follows the pioneering work of Elinor Ostrom. There is also a voluminous technical literature on reducing emissions from deforestation and forest degradation (or REDD) as a climate change mitigation and sustainable development strategy.

Theories about common-pool resource (CPR) governance were initially developed through the study of small-scale commons (Ostrom 1990) where resource users and their interactions are easier to identify and model. Governance of complex and multi-level CPR systems presents novel challenges (Ostrom et al. 1999). Tropical forest landscapes are an example of such a system, where heterogeneous actors have different understandings of resources and the determinants of land use decisions develop at different levels from local to global. Dietz et al. (2003) have synthesized institutional design requirements for multi-level commons governance, as well as general governance principles that help meet these requirements. Institutional design requirements are: providing information, dealing with conflict, inducing rule compliance, providing infrastructure, and encouraging adaptation and change. In addition to fairly universal governance principles that help meet these requirements, such as defining boundaries and applying sanctions, Dietz and colleagues identify three principles that are especially relevant to large-scale commons governance: analytic deliberation (involving interested parties in informed discussion of rules); nesting (allocating authority at multiple levels); and institutional variety.

The more technical literature seeking to evaluate and improve REDD initiatives often applies institutionalist commons governance principles, notably in work produced through the Center for

International Forestry Research's (CIFOR) Global Comparative Study on REDD+ (Luttrell et al. 2011; Duchelle et al. 2014; Ravikumar, Larson, et al. 2015). These studies highlight the importance of factors such as regulatory enforcement, tenure rights, accountability and safeguards, and information sharing in constructing effective policy frameworks for reducing deforestation.

Fundamentally, this multi-level governance literature emphasizes institutions; thus it would seek to explain divergent deforestation trajectories as a function of institutional design principles that somehow Brazil has fulfilled and Indonesia has not.

These three approaches – socio-environmental modernization theories, political ecology, and multi-level commons governance – emphasize respectively the importance of development, conflicts, and institutions in determining environmental outcomes, and I carried the intuitions of each of these approaches with me as I embarked on my fieldwork in Brazil and Indonesia.

Research and Findings

Over the course of two years, from September 2013 to August 2015, I traveled from the cattle ranches of the Brazilian Amazon and the oil palm plantations of Indonesian Borneo to government ministries in Brasília and Jakarta and conservation group offices in Washington, DC. I witnessed firsthand the transformations sweeping the tropics, as forests give way to pastures and plantations and governments and non-governmental organizations (NGOs) seek to govern the frontier. In countless hours in canoes and pickup trucks, over pots of rice and cups of sweet coffee, I talked with the migrant farmers, indigenous villagers, ranchers, bureaucrats, executives, and activists whose struggles are inscribed on the land in charred trunks and forest reserves.

I structured my research as a comparative and ethnographic study focused on the programs of The Nature Conservancy (TNC), one of the largest international environmental NGOs and a key actor in forest governance in both Brazil and Indonesia. I conducted six municipal-level case

studies of TNC projects, four in Brazil and two in Indonesia, as well as an organizational ethnography of TNC's tropical forest conservation programs. At the municipal, state, and national levels, and at TNC's headquarters in the USA, I conducted 181 semi-structured interviews in Portuguese, Indonesian, and English with government officials; international and domestic NGO staff; and representatives of industry, farmer, and community associations. I carried out participant observation at meetings and events, and collected data from news stories, policy documents, and public databases. Through an affiliation with CIFOR, I received access to longitudinal surveys of socio-economic and environmental conditions for approximately 130 households per municipality in two of my Brazil sites and both of my Indonesia sites.

I found that modernization, political ecology, and multi-level governance approaches each help to account for certain aspects of differential policy effectiveness and deforestation trends between Brazil and Indonesia, but overall these approaches fail to adequately locate environmental change within systemic processes of transformation in the global political economy. Socio-environmental modernization theories provide the most systemic perspective, describing forest transitions as an empirical regularity internal to capitalist socio-economic development. I argue that the divergence in deforestation between Brazil and Indonesia is indeed best explained through an analysis of the political economy of natural resources and development, but modernization perspectives misread the dynamics of capitalist development, which are better understood through an ecological political economy grounded in a geographical analysis of extraction and production.

Forest governance strategies in Brazil and Indonesia, I discovered, are strongly influenced by the 'land sparing hypothesis,' which holds that increasing agricultural productivity can spare land for nature. The land sparing hypothesis is closely linked to modernization perspectives, and has been prominent in academic and policy discourse since the 1980s, due to its promise of

reconciling agricultural development with environmental conservation. In Indonesia, as in many other frontier regions, land sparing efforts have been stymied by a complex of government and corporate actors that extracts resources for private gain. In Brazil, however, I found that a complex of government, corporate, and non-governmental actors has succeeded in reducing deforestation through a land sparing model that links forest conservation to agricultural intensification, state-building, and socio-economic development. Land sparing in Brazil favors agro-industry over small farmers, however, and is mostly canceled out by displacement of deforestation to extractive zones like Indonesia. I therefore argue that the land sparing model is a fallacy: it supports industrial expansion and state-building but displaces social and environmental degradation, producing negative global outcomes. This conclusion contradicts socio-environmental modernization theories, which claim that environmental conditions improve at advanced stages of socio-economic development.

Theoretical Framework

The framework for my analysis is rooted in geographical political economy and development sociology. Geographical political economy has developed a critical theorization of the spatial dynamics of capitalism, combining Lefebvre's (1991 [1974]) insights into the social production of space with a materialist analysis of the uneven spatialities of capitalist production and expansion. Two dimensions are key to the geography of capitalism: the internal spatial organization of capitalism, and the dynamics of capitalist expansion. First, with regard to the internal spatial organization of the system, capitalism is typified by the division between town and country or urban and rural (R. Williams 1973; Moore 2000), or in Brenner and Schmid's (2014) updated conceptualization, the concentration and extension of 'planetary urbanization.' This division emerges and sustains itself at the expense of a 'metabolic rift.'

The theorization of the metabolic rift originates with Marx and his analysis of the crisis of soil fertility in 19th-century capitalist agriculture, which has been resurrected in contemporary scholarship by the environmental sociologist John Bellamy Foster. Marx's analysis drew heavily on the work of the German agricultural chemist Justus von Liebig, who explained how capitalism and capitalist agriculture disrupt the soil nutrient cycle by stripping nutrients from rural areas in the form of agricultural produce and concentrating nutrients in the cities, where they become organic waste (Foster 1999). This metabolic rift thus depletes the sources of soil fertility in rural areas at the same time as it overloads sinks for waste disposal in the urban areas, and it creates a necessity for artificial fertilization in agriculture. As Marx wrote in Volume 1 of *Capital*:

> "Capitalist production collects the population together in great centres, and causes the urban population to achieve an ever-growing preponderance. This has two results. On the one hand it concentrates the historical motive force of society; on the other hand, it disturbs the metabolic interaction between man and the earth, i.e. it prevents the return to the soil of its constituent elements consumed by man in the form of food and clothing; hence it hinders the operation of the eternal natural condition for the lasting fertility of the soil. …But by destroying the circumstances surrounding that metabolism … it compels its systematic restoration as a regulative law of social production, and in a form adequate to the full development of the human race. …All progress in capitalist agriculture is a progress in the art, not only of robbing the worker, but of robbing the soil; all progress in increasing the fertility of the soil for a given time is a progress toward ruining the more long-lasting sources of that fertility. …Capitalist production, therefore, only develops the techniques and the degree of combination of the social process of production by simultaneously undermining the original sources of all wealth—the soil and the worker." (Quoted in Foster 1999, 379)

The metabolic rift in this theorization emerges in the divide between country and city and the removal of humans from the land, but it is then globalized through the center-periphery relations of the capitalist world system (Foster 1999; Moore 2000). Schneider and McMichael (2010) critique Marx's formulation of the metabolic rift as it relates to the practices and material flows of agricultural production, but most contemporary scholarship deploys the concept of metabolic rift

in a broader sense to describe the socio-ecological dynamics of uneven capitalist development (N. Smith 1984).

The metabolic rift in this sense describes the flow of embodied energy (resources or 'use value') within the capitalist system (Foster and Holleman 2014). In this conception, I take the metabolic rift to describe the geographical separation of extraction and production. World systems analysis distinguishes between a capitalist core characterized by strong state structures and high value-added production, among other factors typically associated with high levels of capitalist 'development,' and a periphery characterized by weak state structures and low value-added, export-oriented production (Wallerstein 1979). Stephen Bunker (1985) strengthens the ecological basis of the core-periphery distinction by demonstrating how the energy-concentrating, complexifying structures of core economies are dependent on the energy-dissipating, simplifying structures of peripheral economies. The distinction between periphery and core, Bunker argues, is a distinction between 'extraction,' which destroys value in energy and material in the periphery, and 'production,' which absorbs energy and materials through transformation and consumption to concentrate value in the core. Core-periphery (production-extraction) dialectics are reproduced at multiple levels of the capitalist system, instantiating the metabolic rift as a fractal feature of capitalism (cf. Appadurai 1996).

With regard to the internal spatial organization of capitalism, this theorization of extraction and production reveals a multi-level geography of productive cores that enrich themselves at the expense of extractive peripheries. With regard to the dynamics of capitalist expansion, the metabolic rift constitutes "a powerfully globalizing spatial logic" (Moore 2000, 136). The development of productive centers is directly linked to extraction in peripheries. As core-periphery relations develop at the regional level within the world system, the externalization of extraction

and environmental degradation to expanding peripheries may result in environmental improvements in core regions (Tucker 2000; Jorgenson 2006; Walker 2012). This uneven global geography of capitalist development thus creates the illusion of ecological modernization (Mansfield, Munroe, and McSweeney 2010). Environmental conservation or restoration in core regions is dependent on the displacement of degradation to peripheries, and as regional environmental indicators improve in developed areas, global environmental indicators decline.

Still missing from this account of capitalist geography, however, is an analysis of the socio-political dynamics of capitalist growth and transformation. How are extraction and production stabilized and regulated? How is capitalist development directed and governed? My answers to these questions derive from scholarship on the sociology of development and governance. I combine several strands of literature to produce a framework of regimes, complexes, and coalitions for analyzing the sociology of capitalist development, where regimes describe a stabilized political-economic order and complexes and coalitions describe projects of political-economic transformation. First, I expand on the work of Paul Gellert (2010) to argue that extractive and productive economies are associated with extractive or productivist political-economic regimes.[5] These regimes combine the economic mode of production with the institutional structures and socio-political relations that help structure and stabilize economic processes. Extraction may be associated with cronyism or clientelism, policies favoring natural resource exports, and a state bureaucracy that relies more on rents than on public revenues. Productivism may be associated with developmentalist policies favoring articulated industrial production, a professional and technocratic bureaucracy, and strong legal frameworks protecting property rights. These regimes

[5] I use the term productiv*ist* principally to avoid ambiguities associated with the multiple meanings of 'production.' For a full discussion of terminology, see Chapter 3.

coalesce at multiple socially-constructed levels within the capitalist world system. For example, a country may have a productivist regime at the national level that encompasses extractive regimes in some provinces, which in turn comprise a mix of municipal productivist and extractive regimes. The nesting of regimes is the socio-political institutional face of the nesting of core-periphery relations.

Political-economic regimes describe the socio-political instantiation of a mode of production. Complexes describe the socio-political assemblages associated with projects of political-economic transformation anchored in particular fractions of capital at any level of the world system. A complex is an assemblage of actors, institutions, practices, and discourses that seeks to structure accumulation in a particular way (Li 2007a). Like a regime, a complex is both material and ideational, linking a particular fraction of capital with the epistemic and governmental formations that help support and direct that fraction. At the level of the global economy, for example, a 'neoliberal complex' has coalesced around a core of transnational corporate and financial capital. Animated by the ideology of the Washington Consensus, the neoliberal complex has advanced a project of privatization, marketization, and deregulation through the actions and interactions of governments, international financial institutions, multinational corporations, and others. Myriad complexes populate the world system, related to particular industrial sectors, commodities, and transformative projects, each associated with different fractions of capital, e.g., the fossil fuels complex, the sustainable development complex, and the military-industrial complex. Complexes may overlap or be nested (such as the wind energy complex within the renewable energy complex) and actors may participate in multiple complexes – the complex, like any fraction of capital, is not self-contained, but rather identifies an assemblage within a larger network (ultimately, the global political economy).

A complex describes relationships among actors with complementary interests and discourses anchored in a fraction of capital. Complexes do not act as a unit, however. A complex's program advances in different places and moments through political-economic 'coalitions.' Coalitions are assemblages that emerge when members of a complex ally with each other (and possibly other actors) to advance particular projects supporting their common agenda; they are the bridge between a complex and the implementation of policy. These coalitions are instances of "developmental coalitions" (P. Evans 1995) or "growth coalitions" (Rudel 2009), i.e., social groupings dedicated to promoting particular processes of socio-economic and environmental transformation. The fossil fuel complex, for example, may act through a fossil fuel coalition seeking to promote tar sands development in Canada, or a coalition seeking to obstruct carbon emissions regulation in Washington, DC.

The distinction between extraction and production as the foundation of the metabolic rift in the capitalist world economy, and the identification of regimes, complexes, and coalitions as capitalist sociological formations, provide a framework for the analysis of political-economic transformations. In this dissertation, I deploy this framework to analyze changes in forest governance and land use in Brazil and Indonesia.

The Argument

I find that forest conservation policies in both Indonesia and Brazil are strongly influenced by the land sparing hypothesis. The Nature Conservancy and other environmentalist actors and initiatives in both countries promote land use intensification as a strategy for decoupling economic development from deforestation. Since the late 1990s, TNC has been at the forefront of shifts in international conservation policy and practice towards an 'eco-pragmatist,' ecosystem services approach that eschews biodiversity-focused conservation for a focus on 'working landscapes'

(Kareiva, Marvier, and Lalasz 2012). In moving from preservationism to sustainable developmentalism, TNC and transnational environmental NGOs (TENGOs) have become closely networked with intergovernmental organizations, governments, and multi-national corporations across multiple levels and scales in a sustainable development complex. Within the sustainable development complex, an assemblage of researchers, NGOs, development organizations, agribusiness actors, and government policymakers coalesced in the 2000s into a global 'land sparing complex.' TNC has been central to the establishment of the land sparing complex in Brazil and Indonesia.

During the 1990s and 2000s, as TNC shifted from a focus on protected areas to 'sustainable production,' land sparing emerged as a core element of the organization's tropical forest conservation strategy. TNC became one of the first environmental NGOs to work with soy agribusiness in the Amazon, and the organization helped pioneer governance measures to support compliance with the Brazilian Forest Code, which requires the preservation of a proportion of native vegetation on private lands. TNC's programs in Brazil intersected with government environmental regulation and corporate supply chain governance as the organization became part of land sparing coalitions that deployed new governance frameworks to achieve dramatic reductions in Amazonian deforestation after 2004. TNC has launched programs directly supporting agricultural intensification, especially for cattle ranching, in both Brazil and Mexico, as the land sparing hypothesis has come to infuse not just tropical forest programs, but also TNC's entire 'Global Lands' strategy. In Indonesia, the global land sparing complex has gained less purchase at the national level, but TNC's conservation programs maintain a land sparing premise. TNC works with villages to intensify agriculture to limit deforestation and has undertaken studies comparing

extensive timber production through selective logging with intensive production on timber plantations.

TNC and other actors within the global land sparing complex have attempted to implement policies linking forest conservation and land use intensification in Indonesia, Brazil, and elsewhere in the tropics. In Indonesia, as in much of the tropics, forest conservation policies have been largely ineffective in constraining deforestation since the 1970s. Protected areas have been 'paper parks,' and new land sparing and other green growth initiatives have failed to check accelerating deforestation during the 2000s. I argue that conservation policies have been ineffective in restraining deforestation in Indonesia and many other tropical regions because these regions fall under extractive political-economic regimes.

Indonesia is ruled by an extractive regime at the national level that facilitates unsustainable logging and plantation and mining expansion and stymies the efforts of a land sparing complex of primarily international actors to promote land use intensification and reduce deforestation. Tree plantation agriculture and plantation forestry are the primary drivers of Indonesian forest conversion. Although plantations are a relatively intensive mode of production, low quality inputs, poor land use planning, and a timber subsidy from the clearing of plantation land mean that much of the Indonesian plantation economy operates in an ecologically extractive mode, while local populations are marginalized or adversely incorporated (Hickey and Toit 2007; John McCarthy 2010). The plantation economy is an extractive peripheral formation that contributes to long-term socio-ecological degradation as opposed to productivist socio-ecological development. Environmentalist actors advocate a productivist transformation of the plantation economy through a land sparing lens, promoting land use intensification (principally through the siting of plantation expansion on 'degraded lands') as well as increasing productivity of smallholder and plantation

agriculture. In counterpoint, the present wave of extractive plantation expansion, like the previous wave of extractive industrial logging, is supported by an extractive political-economic regime characterized by close relationships between companies, politicians, and the Indonesian military; concentration of authority over forestlands in the Ministry of Environment and Forestry; widespread corruption; and weak enforcement of environmental regulations.

The national-level extractive regime in Indonesia is reinforced by extractive regimes at the provincial and district levels in my case study districts of East Kutai and Berau in East Kalimantan Province of eastern Indonesian Borneo (Kalimantan). East Kalimantan is the primary target province of TNC-Indonesia's Terrestrial Program, and these case studies were selected as similar districts with contrasting histories of TNC engagement. Despite declaring itself a 'green province' and receiving substantial support from bilateral programs such as the German Government's Forests and Climate Change Programme (FORCLIME) and a debt-for-nature swap from the US Government, as well as from TENGOs including TNC and WWF, the East Kalimantan provincial government has continued to support an extractive economy by abetting the growth of mining activity, primarily open pit coal extraction, and the rapid expansion of oil palm and tree fiber plantations.

East Kutai district, in the northern part of the province, presents a picture of almost complete landscape conversion under an extractive regime, having undergone large-scale deforestation for tree plantations and coal mining, as well as encroachment and deforestation in Kutai National Park. TNC is active in East Kutai through a high-profile orangutan conservation project in cooperation with a local indigenous group, and more recently through forays into larger-scale planning aimed at coordinating conservation set-asides in industrial concessions. 'Development' in East Kutai has come at a cost of severe environmental degradation, yet TNC's

orangutan project with the Wehea Dayak indigenous people is widely cited as a success story by TNC and the East Kutai government. This paradox demonstrates what I term the 'Pyrrhic' logic of conservation in the face of extraction and the positions of 'indigeneity' and 'forest' as residual categories in the extractive landscape, albeit with their own possibilities for commoditization.

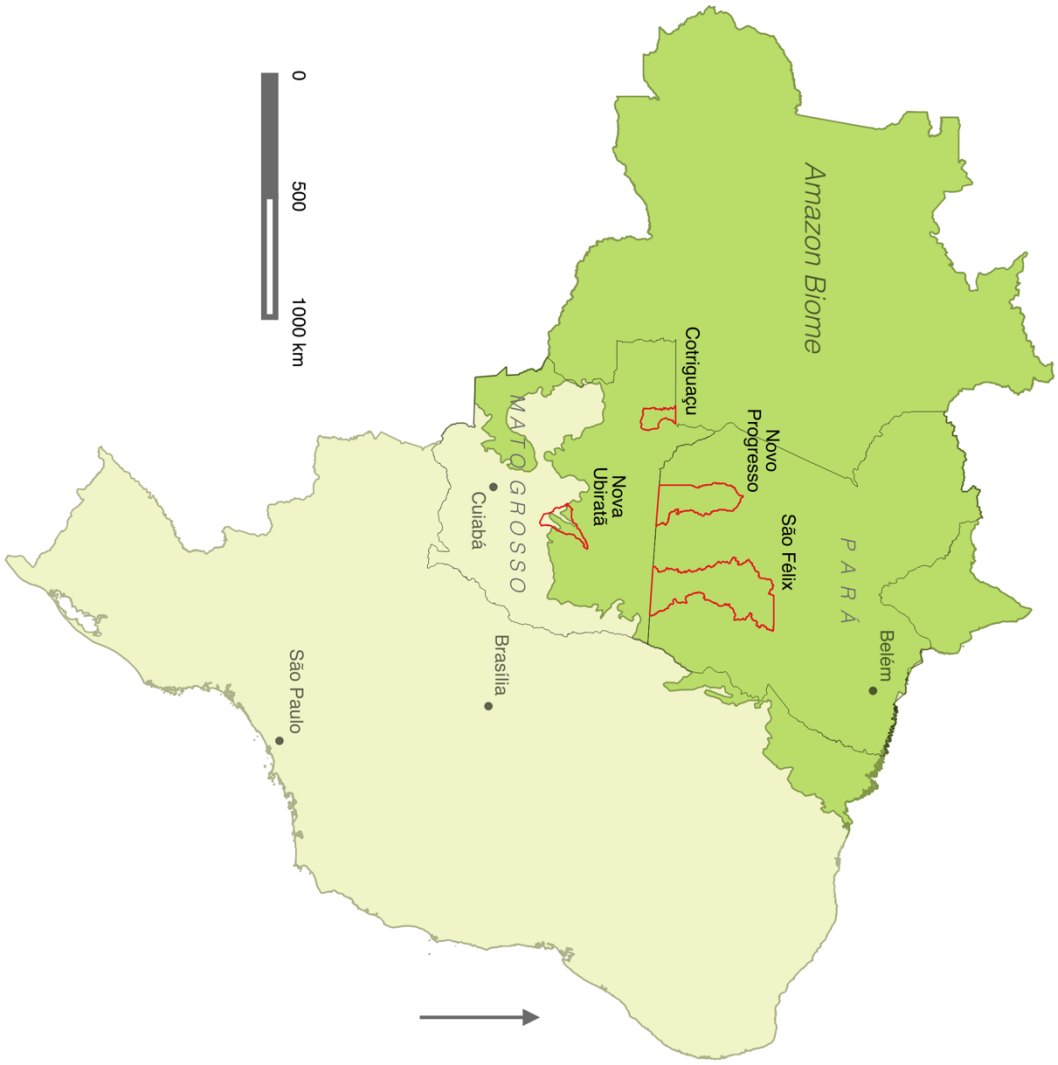
Berau District, East Kutai's neighbor to the north, contains some of the largest remaining areas of lowland forest in Kalimantan and is the site of a major TNC REDD project. Nonetheless, the land sparing coalition in Berau has failed to catalyze a productivist transformation, and a district-level extractive regime continues to predominate. While TNC is devoting some efforts to oil palm sustainability, no coalition has managed to integrate district government and corporate actors to effectively limit plantation and mining expansion. Unable to oppose the extractive economy, environmentalist actors have developed a land sparing coalition focused on the control of villagers' swidden agriculture as a strategy for limiting deforestation and promoting economic development. Industrial clearing dwarfs forest conversion in swidden systems and undermines the conservation gains of swidden-limiting forest governance, however, maintaining the dominance of extractive processes.

These Indonesian cases demonstrate the operation of an extractive regime across multiple levels. Political-economic relations and institutions in Indonesia are organized to support extraction, and this extractive regime mediates the possibilities for forest governance and regional development. Efforts by international actors such as The Nature Conservancy and bilateral cooperation agencies are stymied by extractive structures. Even where local allies support a land sparing agenda, such as parts of the provincial government in East Kalimantan and the district government and local NGOs in Berau, these lower level productivist impulses and their goals of

land sparing and ecological modernization are limited and undermined by the national extractive regime.

Figures 1.2-3: 1.2) Map of Indonesia showing East Kutai and Berau districts in East Kalimantan; 1.3) Map of Brazil showing municipalities of Nova Ubiratã and Cotriguaçu in Mato Grosso and São Félix and Novo Progresso in Pará.


Jakarta
Kalimantan
Samarinda
East Kalimantan
East Kutai
Berau
0
500 km


0
500
1000 km
Amazon Biome
Cotriguaçu
Novo Progresso
São Félix
Nova Ubiratã
MATO GROSSO
PARÁ
Cuiabá
Brasília
Belém
São Paulo

In Brazil, the Amazon region has historically also been characterized by an extractive economy driven by 'boom-and-bust' resource exploitation that fails to generate longer-term productive circuits of accumulation. Cattle ranching in the Amazon, the land use occupying the majority of deforested land (Sy et al. 2015), has operated in an extractive mode reinforced by speculation. The productive value of the herd is often secondary to the ability to profit from future land sales and government subsidies. Where the exchange value of land far exceeds its productive value, land managers have few incentives to invest in sustainable practices (Hecht 1985). Ranchers consolidate large properties, frequently through coercive or illegal 'land grabbing,' extract the fertility of deforested land through unmanaged or excessive grazing, and then as pastures become degraded they move on to grab and clear new areas (Rodrigues et al. 2009). Since the mid-1980s, cattle ranching has also become widespread among smallholders (Smeraldi and May 2008), intensifying cycles of land degradation and frontier expansion. Insecure land tenure, especially for smallholders, has been a further factor promoting deforestation (to establish ownership through 'productive use') and inhibiting agricultural intensification (by hindering credit access and discouraging capital investments) (Alston, Libecap, and Mueller 1999; W. Jepson 2006b). This Amazonian extractive economy has enriched loggers, ranchers, and speculators at a cost of deforestation, land degradation, and dispossession, without supporting regional socio-economic development.

While the Amazon remained largely an extractive periphery until the 21st century, the Brazilian state since World War II has been controlled by a developmentalist regime promoting productivist modernization. During the 2000s, opposition to the Amazonian extractive economy from local populations, environmentalists, and productivist elements of the Brazilian state and transnational capital converged to assemble a land sparing complex aimed at shifting the political-

economic regime of the Amazon region from extraction to productivism.

The Brazilian land sparing complex deployed environmental regulation in a project of economic development and state-building in a way that inverted previous strategies of state territorialization and environmental conservation. Under the land sparing complex, territorial constriction became a strategy for stimulating agricultural intensification and preventing agricultural land expansion. The creation of protected areas to act as 'green barriers' to agricultural expansion (Soares-Filho et al. 2010) and enforcement of the Brazilian Forest Code, which requires that rural properties maintain a proportion of their area under natural vegetation, anchored the land sparing complex with territorial constriction, while support for sustainable production and tenure regularization were advanced in part to facilitate land sparing intensification. In the ideal productivist model, dynamic interactions between constriction and intensification will transform the political-economic regime in the Amazon region: protected area creation and Forest Code enforcement contribute to state-building through territorialization and produce territorial constriction; territorial constriction guarantees forest conservation while inducing agricultural intensification, which is also supported by tenure regularization and agricultural policy; agricultural intensification catalyzes socio-economic development; and development and state-building are mutually reinforcing. This model is geared towards the consolidation of agro-industrial production, and inequitable environmental enforcement contributes to smallholder dispossession. While this land sparing project has succeeded in dramatically reducing deforestation within the Amazon region, the transition to productivism has been unevenly and incompletely realized, and deforestation reductions have been accompanied in some areas by economic stagnation. Extractive interests have pushed back against the land sparing agenda, with a revision of the Forest Code in 2012 and efforts to weaken protected areas. The deforestation

trend in Brazil reversed in 2012 and annual deforestation rates have inched upwards, while the Temer administration that took power after the impeachment of Dilma Rousseff threatens to reverse the Amazon's land use transition by unleashing a new wave of extraction.

The Nature Conservancy's programs in Brazil at the time of research were organized into two eco-regional programs, one more active in Mato Grosso State and one more active in Pará State. My organizational ethnography and case studies incorporated both these programs, providing a subnational comparison of forest governance across the two most rapidly deforesting states in the Amazon. For each eco-regional program, I conducted two municipal-level case studies, selecting the municipality where TNC staff reported their projects most successful and the municipality where they reported greatest difficulties.

Mato Grosso is governed by a productivist political-economic regime dominated by soy interests, while some extractive frontiers of ranching, logging, and mining persist in the state's northwest. TNC activities in Mato Grosso traverse the boundary between expanding industrial soy agriculture and frontier logging and ranching areas. The large-scale forest clearing that previously characterized the Mato Grosso frontier has been greatly reduced by a focus on compliance with environmental regulations concurrent with soy expansion into pastureland and ranching intensification, transforming the state from an extractive to a productivist economy. During the 1990s and early 2000s, Mato Grosso was the state with the highest annual deforestation in the Amazon, but after 2006, it was overtaken by Pará, where a more heterogeneous frontier has presented greater difficulties for forest governance and the transition from extraction to production.

In Mato Grosso, I compare the municipalities of Nova Ubiratã and Cotriguaçu. Nova Ubiratã is the municipality most integrated into a productivist, agro-industrial economy out of the four Brazilian cases. Favored by its location along the BR-163 agricultural corridor, Nova Ubiratã

has experienced rapid growth in soy production, which has helped drive ranching intensification. TNC was successful in a project promoting municipal compliance with environmental regulations, supported by a modernizing, technocratic mayor. Today, Nova Ubiratã is a post-frontier municipality with little forest area that could legally be open to conversion, approximating the productivist, ecologically-modernized landscape envisaged by land sparing advocates.

Cotriguaçu is the opposite of Nova Ubiratã in that the municipality has stagnated as a zone of extraction. A REDD project in Cotriguaçu initially planned with TNC was subsequently led by a local NGO, and TNC's follow-up activities in the municipality have been plagued by difficulties. Timber extraction in the municipality is seen to be on the decline, and ranching is not very profitable due to isolation and poor terrain. TNC worked with a consortium to lay the groundwork for a REDD project in Cotriguaçu beginning around 2008, but then decided to focus its efforts on São Félix do Xingu in Pará as the more dynamic and geographically critical frontier zone, ceding leadership of the Cotriguaçu project to ICV, a Mato Grosso NGO. Assembled through the REDD project, a relatively strong land sparing coalition in Cotriguaçu has supported Forest Code enforcement and ranching intensification. The municipality remains an area firmly in the periphery, however, where commercial activity is primarily extractive logging and ranching, and despite productivist policies at the federal, state, and municipal levels, there are few material prospects for more productivist economic activity.

The Mato Grosso municipalities, differentiated primarily by the geography of the soy frontier, represent the more extreme cases of a productivist economy (Nova Ubiratã) and an extractive economy (Cotriguaçu) of the four Amazonian cases, while the Pará municipalities represent active frontier zones that have been the most dynamic spaces for the application of a land

sparing forest governance agenda aimed at the political-economic transformation of the extractive frontier.

Between 1988 and 2013, Pará was responsible for 33 percent of total deforestation in the Brazilian Amazon, and since 2006 it has been the state with the highest annual deforestation rate. The state is characterized by extractive frontiers dominated by forest conversion to cattle pasture, while logging and mining interests remain important to the economy and state politics. Nonetheless, the state government has largely supported a land sparing agenda and productivist transition, through measures such as development of a rural environmental registry and creation of a statewide 'Green Municipalities Program.' I compare the municipalities of São Félix do Xingu (São Félix), site of a major TNC REDD program, and Novo Progresso, where a TNC project was largely unsuccessful and the organization subsequently left the municipality.

In São Félix, protected area creation closed the deforestation frontier, and command and control actions have strongly reduced predatory extractive activities. Constriction strengthened state territorialization and stimulated the integration of the municipal government and ranchers' syndicate into a municipal land sparing coalition. Land sparing policies have not yet translated into widespread agricultural intensification and socio-economic development, however, leaving the municipality economically paralyzed as NGOs and government seek ways to overcome barriers to intensification. Meanwhile, the imposition of punitive measures without corresponding positive incentives disproportionately impacts smallholders, contributing to the exit of family farmers from the rural zone and the consolidation of large-scale ranching operations.

In Novo Progresso, the creation of protected areas was heavily contested. Command and control actions from the federal government largely failed to curtail land grabbing in the Jamanxim National Forest (FLONA), despite substantial reductions in deforestation at the municipal level.

Resistance to the FLONA stems from its creation in an area of active occupation and strong expansionary pressures, while the strictly protected areas in São Félix were created in zones still relatively remote and sparsely occupied. In addition to the difficulties of the federal government in implementing the FLONA, NGOs have been unable to gain traction, stymied by the municipal extractive regime. While TNC attempted to establish a presence in support of Forest Code compliance, it faced strong resistance and left the municipality without attaining its project goals. In a context of only partial constriction, few positive incentives from agricultural policy or tenure regularization, and municipal politics abetting extractive expansion, ranching intensification has been weak, while initial pasture-to-cropland conversions have been linked to the approach of the soy frontier. Recent events have continued to undermine constriction and facilitate agricultural expansion. In December 2016, in a victory for extractive coalitions, the Temer government announced a 43 percent reduction of FLONA Jamanxim, decreasing the strictly-protected area in Novo Progresso by 30 percent and legalizing extensive landgrabs.

The differential effectiveness of land sparing coalitions in the two municipalities in Pará, resulting in effective constriction and stagnation in São Félix and ineffective constriction and extractive expansion in Novo Progresso, is explained primarily by differential investment in governance by external actors, coupled with frontier geography and the indirect effects of pasture-to-cropland intensification.

The Brazilian case studies illuminate conditions for the implementation of the Amazonian land sparing agenda. Territorial constriction is necessary but not sufficient for land sparing intensification. The effectiveness of constriction depends on how it is imposed and existing pressures in an area. Without constriction, deforestation may continue even as intensification occurs. With constriction, intensification should allow for increasing agricultural production over

a constant area, but intensification is not the inevitable outcome of land scarcity. Intensification through individual investment is occurring on some large properties, but more widespread intensification requires either arrival of the row-crop frontier or additional investments by land sparing coalitions. A key question for the future is thus whether the land sparing complex can effectively catalyze ranching intensification through constriction and positive incentives absent land pressure from industrial row-cropping.

The Brazilian Amazon provides an empirical example of a regional transformation from an extractive to a productivist political-economic regime. In the Amazon, we see how policy, promulgated through higher-order political economic regimes and complexes, can steer development trajectories, and how peripheral regions can be 'modernized.' The success of the Brazilian land sparing complex, and the Amazonian productivist transformation, are nonetheless partial and incomplete, having advanced further in Mato Grosso than in Pará, and further in Nova Ubiratã and São Félix than in Cotriguaçu and Novo Progresso. As productivist centers grow in the socio-economic poles of the urban Amazon (Browder and Godfrey 1997; Garcia, Soares-Filho, and Sawyer 2007), extractive zones remain in areas that are remote or where land sparing coalitions are weak, due primarily to factors of physical and economic geography. All regional economies are an uneven mix of extraction and production, contrary to modernization perspectives that tend to view nations or regions as homogenous units. Political-economic regimes do operate at defined levels, however, and in the case of the Amazonian political-economic regime, the establishment of productivist politics and institutions is still incipient. The prospect of an extractive resurgence under the Temer administration may further counter the land sparing project and the productivist vision of articulated socio-economic development.

Political-economic regimes, like the productivist regime in Brazil and the extractive regime in Indonesia, mediate the effectiveness of land sparing policy and determine regional development trajectories. Regimes are mutable. Efforts by the Brazilian land sparing complex to shift the Amazonian economy from extraction to production have resulted in an over 70 percent reduction in deforestation rates since 2004. Productivist modernization is not a global solution to tropical deforestation, however. Production and extraction are integrally interdependent. Deforestation reductions and the productivist transition in the Amazon have displaced extraction elsewhere, driving accelerating agricultural expansion and ecological destruction in the coupled frontiers of the Brazilian *Cerrado* tropical savanna region, the Paraguayan *Chaco* woodlands, and the rainforests of the extra-Brazilian Amazon. Displacement also operates more indirectly through the world system, accelerating deforestation in other zones of tropical extraction such as Indonesia. As deforestation in the Brazilian Amazon has declined, global tropical deforestation has accelerated by over 2100 km^2 per year (Hansen et al. 2013). Land sparing, I argue, is a fallacy. It highlights local improvements while ignoring global degradation. Land sparing and other socio-environmental modernization agendas persist because they support industrial development and state-building, but they have negative global social and ecological impacts.

Implications

This study demonstrates the strengths and weaknesses of some of the existing literatures on the politics of socio-ecological change. With regard to the political ecology approach, I find that focusing on contestation around ecological distribution conflicts provides valuable insights at the local and regional levels, but more systemic analysis requires a robust theoretical framework, which political ecology does not contain. The distinctiveness of political ecology lies in its focus on the actions of resource users and their linkages to broader processes (Blaikie and Brookfield

1987; Peluso 1992b; Watts and Peet 2004). This is not to say that political ecology is caught in a 'local trap' (Brown and Purcell 2005) so much as that political ecology is rooted in land managers and the labor process, and at broader scales, where some scholars have advocated a 'global political ecology' (Peet, Robbins, and Watts 2011), it blurs into macro-level critical political economy, where more explicit theoretical frames, such as ecological Marxism and world systems, are available to orient systemic analysis.

With regard to the literatures on multi-level governance and socio-ecological modernization, I find that institutions play a key role in the development process and that 'development' is key to trajectories of environmental change. Tropical forest policy has reduced deforestation in Brazil but not in Indonesia due to the construction of particular governance institutions within a project of productivist developmental transformation. The decoupling of industrial agricultural growth from deforestation works only regionally, however, displacing extractive and expansionary processes to other regions. Socio-ecological modernization is thus a partial narrative that commits a fallacy of composition, mistakenly believing that local improvements indicate the pathway to global sustainability.

This study builds an alternative theoretical framework from geographical political economy and development sociology to show that capitalist development operates through a dialectic of extraction and production. This dialectic is stabilized and governed by political-economic regimes, while projects of political-economic transformation are advanced by complexes and coalitions linked to different fractions of capital. I use this framework to explain why forest conservation efforts in Indonesia have been largely unsuccessful, and to demonstrate how and why a complex of powerful actors has come together to reduce deforestation in the Brazilian Amazon, though at a cost of smallholder dispossession and frontier displacement. These

findings advance our understanding of the political ecology and political economy of tropical land use change and development, while contributing to our empirical and theoretical understandings of the sociology and geography of the global political economy. My finding that Amazonian deforestation reductions deliver minimal global benefits contradicts efforts to situate Brazil as a global model for conservation. Rather, contrary to the land sparing hypothesis, this research implies that forest conservation and agro-industrial development are fundamentally irreconcilable. More broadly, contrary to socio-environmental modernization theories, capitalist development cannot be sustainable, because it depends fundamentally on expanding ecological extraction.

Outline of the Dissertation

This dissertation is organized into three parts. Part I continues in Chapter 2 with a discussion of key empirical concepts, research design, and methods. I define forest and deforestation, discuss how deforestation is measured, and review research on historical deforestation trends. I then discuss different approaches to studying socio-ecological relations and global political-economic phenomena. I explain my research focus on Brazil and Indonesia and my decision to focus on the programs of a transnational environmental actor, The Nature Conservancy. I explicate the research design, which combines organizational ethnography with nested municipal case studies, and I describe my methods, which included over two years of transnational fieldwork. In Chapter 3, I explain the history of the land sparing hypothesis and its relation to modernization perspectives in conservation biology. I then present my alternative theoretical framework centered on the relation between extraction and production and the political organization of the capitalist world system.

Part II comprises the empirical chapters of the dissertation. Chapter 4 focuses on The Nature Conservancy. I trace the rise of land sparing as the core of TNC's forest conservation and

sustainable development strategy, drawing on interviews with TNC staff and my organizational ethnography of TNC's tropical forest conservation programs. This history provides a background for understanding TNC programs in Brazil and Indonesia and the epistemic underpinnings of the land sparing complex. Chapter 5 describes forest governance and land use change in two districts of East Kalimantan, Indonesia, where land sparing and other forest conservation efforts have been hindered by Indonesia's extractive political-economic regime. Chapter 6 then explains how a land sparing complex of government, NGO, and corporate actors coalesced in Brazil to drive deforestation reductions in the Amazon as part of a strategy of economic development and state-building through environmental governance, with the ultimate goal of shifting the regional economy from a mode of extraction to a productivist mode of articulated, broad-based development. I illustrate variation in forest governance and its socio-economic and ecological effects across four different municipalities in two different states within the eastern Amazonian 'arc of deforestation,' demonstrating the partial and incomplete realization of the Amazon's productivist transformation. Chapter 7 examines displacement, showing that regional reductions in deforestation in the Brazilian Amazon have been offset by the development of new frontiers in the Brazilian Cerrado and neighboring countries including Paraguay, Bolivia, and Peru.

Part III consists of Chapter 8, which concludes the dissertation. Extraction and production are integrally linked across scales; thus I maintain that 'land sparing' is a fallacy that highlights local improvements while ignoring global degradation. Land sparing and other socio-environmental modernization agendas persist because they support industrial development and state-building, but they have negative global social and ecological impacts. Alternatives abound, but in order to realize them we must first abandon the myth of ecological modernization.

CHAPTER 2

WHAT IS DEFORESTATION AND HOW CAN WE STUDY IT?

BACKGROUND, FRAMEWORKS, AND METHODS

In this chapter, I provide background on forests, the drivers of forest cover change, and historical deforestation trends in Brazil and Indonesia. I then discuss different conceptual frameworks and methodologies for the study of global environmental governance, and I describe my research design and methods for studying tropical forest governance in a comparative and transnational perspective.

What Is a Forest, Why Is It Important, and How Is It Measured?

'Forest' in the modern usage refers to "an area covered by trees" (Lund 2002, 21). The etymology of forest is usually traced to the Latin *foris*, meaning 'outside,' and denoted an area 'beyond.' *Forestis silva* were "the outside woods," which generally comprised royal hunting grounds (Harrison 1992, 69). For the contemporary meaning, Lund (2002) finds that most definitions of forest refer to either an administrative unit, a type of land cover, or a type of land use. As environmental policies target deforestation at national and global levels, including under a UN-sanctioned international REDD mechanism, forest definitions play an increasingly important role in structuring the transformation of tropical landscapes.

Putz and Redford emphasize that "There is a clear need for widely accepted definitions of forest, deforestation, forest degradation, and forest restoration that are politically expedient but culturally sensitive, ecologically reasonable, and technologically feasible. The danger of overly simple definitions is that they can obscure substantial losses in what most people value as forest" (2010, 12). The UN Food and Agriculture Organization (FAO), for example, which since 1946 has been one of the primary international bodies monitoring forests, defines forest as "Land spanning

more than 0.5 hectares with trees higher than 5 meters and a canopy cover of more than 10 percent, or trees able to reach these thresholds in situ. It does not include land that is predominantly under agricultural or urban land use," and excludes agricultural tree plantations (FAO 2010, 6). Putz and Redford note that the FAO's distinction between natural forests and plantations is "often overlooked" and was not reflected in the Kyoto Protocol to the UN Framework Convention on Climate Change, such that "under the guidelines of the Kyoto Protocol, old growth natural forests could be defaunated, clear-cut, or replaced by monoclonal stands of genetically modified exotic tree species grown for oil or fiber on 5–10 year rotations with no change in 'forest' cover" (2010, 12). While recognizing that forest inherently "will remain something of a social construct," Putz and Redford propose a classification system focused on ecosystem structure and composition that is based on "old growth forest" as a reference state, in which specificities may vary according to forest type, but which is characterized by old trees and associated structural characteristics and has not been substantially modified in composition (through silviculture) or in structure (through degradation processes such as uncontrolled harvesting, pollution, species invasion, or fire).

Putz and Redford's classification effort reflects a concern for the multiple values or 'ecosystem services' provided by forests. Deforestation is the second-largest source of anthropogenic carbon dioxide emissions after fossil fuel combustion (van der Werf et al. 2009), and humid tropical forests are among the most carbon-dense forest types (Saatchi et al. 2011), making tropical deforestation a major driver of global climate change (Harris et al. 2012). Humid tropical forests are also the most biodiverse terrestrial ecosystems (Forseth 2012) and provide important hydrological services at regional and continental scales, including water purification and regulation of rainfall and river flow critical for economic activities such as agriculture and hydropower generation (Sheil and Murdiyarso 2009; Arraut et al. 2012; Makarieva et al. 2014;

Stickler et al. 2013). Forests have important cultural and aesthetic values, and the UN estimates that 300 million people live in forests, while over 1.6 billion people depend on forests for their livelihoods (United Nations 2011). Tropical deforestation is thus central to global trends of climate change, biodiversity loss, and the transformation of rural societies and regional economies.

Definitions of forest in Brazil and Indonesia capture only some of the myriad values associated with forest ecosystems. The Amazon Basin in South America contains the largest contiguous area of humid tropical forest in the world. Several political and geographic designations structure forest policy in the Brazilian Amazon. Since the 1950s, the Brazilian Federal Government has engaged in development planning that specially targets the country's northern and western interior. The 'Legal Amazon' region was designated by Law 1806 on 06 January 1953 and took its present form with Brazil's 1988 Constitution to include the states of Acre, Amapá, Amazonas, Mato Grosso, Pará, Rondônia, Roraima, Tocantins, and the state of Maranhão to the west of 44° West longitude. The Brazilian Institute of Geography and Statistics (IBGE) defines biomes in Brazil as "a formation of flora and fauna constituted by a regionally contiguous and identifiable grouping of vegetation types, characterized by similar geoclimatic conditions and a common history of change, which produces a distinct assemblage of biological diversity," and it distinguishes the Amazon Biome on the basis of its "climatic unity, forest structure, and geographical location" (IBGE 2004). At 4,196,943 km^2, the Amazon Biome covers 49 percent of the Brazilian territory and is located entirely within the Legal Amazon region.

Forest clearing in the Amazon Biome is monitored by the Brazilian National Institute for Space Research (INPE), whose data form the basis for the Brazilian Government's policies for combatting deforestation. Since 1988, INPE's PRODES program has used Landsat satellite imagery to annually report deforestation of areas over 6.25 ha in the Amazon. INPE defines

deforestation as the clear-cutting of primary forest, meaning that forest degradation that stops short of full conversion to an alternative land cover is not reported. Furthermore, once an area has been clear-cut, it is considered permanently deforested, so secondary forest regrowth is not considered in deforestation calculations. Detection of deforestation via satellite can also be impeded by cloud cover. Deforestation under cloud cover may go unobserved for one or several years, and while INPE makes estimates of unobserved deforestation, cloud cover affects the uncertainty of yearly estimates (Câmara, Valeriano, and Soares 2006), especially at smaller scales where the percentage of cloud cover may be substantial. Brazil has been highly successful at reducing Amazonian deforestation according to these definitions. At the same time, the government's definition of Amazonian deforestation and its focus on combatting deforestation in the Amazon lead to a number of occlusions and collateral effects. Land conversion may be displaced from the Amazon to other biomes, such as the Cerrado savanna region, which have less restrictive governance, while within the Amazon, actors may avoid large-scale clear-cuts in favor of degradation, small-scale clearing, or recutting of secondary forest areas (WWF 2011; Davidson et al. 2012; Rosa, Souza, and Ewers 2012; Godar et al. 2014; Oliveira and Hecht 2016).

In Indonesia, 'forest' has been first and foremost an administrative definition. Beginning in the colonial period, and continuing after Indonesian independence in 1945, the demarcation and management of "political forests," or "lands states declare as forests," has been a fundamental component of state-building and economic development (Peluso and Vandergeest 2001). The Basic Forestry Law of 1967, promulgated by Suharto's 'New Order' government, designated 74 percent of Indonesia's surface area as 'forest estate' (*kawasan hutan*), which fell under the control of the central government's Ministry of Forestry. Within the forest estate, areas are classified according to permitted land uses, which under the Consensus Forest Land Use Plan (*Tata Guna*

Hutan Kesepakatan, TGHK), created in the early 1980s, comprise nature reserve or conservation areas, protection forests, limited production forests, normal production forests, and conversion forests. Conservation and reserve forests are geared to the protection of biodiversity and ecosystem function, protection forests are intended to protect soil and hydrological functions, limited production forests are open to low-intensity selective logging, normal production forests are open to more intensive logging, and conversion forests may be fully logged and converted to agricultural or other land uses, at which point they are excised from the forest estate and reclassified as 'other use areas' (*Areal Penggunaan Lain*, APL). These classifications are ostensibly based on topographic and climatic characteristics, including slope, soil type, and rainfall intensity, but they were decided without regard for local land uses or existing land cover (Peluso 1995), and it is not uncommon for land within the forest estate to be highly degraded or occupied by settlements or agricultural land uses.

Large-scale mapping of land cover in Indonesia began in the late 1980s with the government's RePPProt project (Regional Physical Planning Programme for Transmigration), which used Landsat imagery and aerial photography to support regional planning, especially for internal migration programs linked to agricultural plantation development (Peluso 1995). The Indonesian Government did not undertake regular, comprehensive, remote sensing-based forest cover monitoring as was done in Brazil, however, and so reliable land cover data were available only piecemeal and at irregular intervals (e.g., Fuller, Jessup, and Salim 2004) until the late 2000s. In 2009, enabled by advances in satellite imagery availability and processing capacity and inspired by new programs for near-real time deforestation monitoring in Brazil, a team led by David Wheeler at the Center for Global Development in Washington, DC launched Forest Monitoring for Action (FORMA), a remote sensing-based system using MODIS imagery that tracked tropical

deforestation initially at one-month intervals with a resolution of 1 km^2 (Hammer, Kraft, and Wheeler 2009; Kraft 2014). FORMA permitted more fine-grained spatial and temporal analysis of tropical deforestation, including in Indonesia, from 2006 onwards (Wheeler, Kraft, and Hammer 2011; Wheeler et al. 2011). At the same time, a team led by Matthew Hansen of the University of Maryland was developing global forest change maps using higher-resolution Landsat imagery (Hansen et al. 2008; Hansen, Stehman, and Potapov 2010). In 2009, Hansen et al. released an analysis of Indonesian deforestation for two periods, from 1990-2000 and 2000-2005, which showed much higher average annual clearing in the 1990s, but a "near-monotonic increase" in clearing from 2000 to 2005 (Hansen et al. 2009). The extremely high rates of forest loss in the 1990s, however, were substantially driven by massive forest loss due to fires during the 1997-1998 El Niño (Siegert and Hoffmann 2000; Fuller, Jessup, and Salim 2004).

In 2013, Hansen et al. revealed their high-resolution global forest change maps, which tracked forest loss and gain from 2000 to 2012 at a spatial resolution of 30 meters. The Hansen study considered trees as vegetation higher than 5 meters, and considered forest loss as stand-replacement disturbance, reporting loss figures on an annual basis for different densities of canopy cover. The Hansen maps track forest cover without regard to land use, so forest loss may represent harvesting in a tree plantation, for example. Nonetheless, the Hansen data represented a milestone by providing internally-consistent, spatially explicit quantifications of forest loss and gain, as well as annual estimates allowing for analysis of forest loss trends (Hansen et al. 2013). In particular, Hansen et al. highlighted "converging rates of forest disturbance" in Indonesia and Brazil, estimating that forest loss in Brazil slowed by an average of 1318 km^2 per year in 2000-2012, while forest loss in Indonesia accelerated by 1021 km^2 per year (Hansen et al. 2013, 850).

FORMA and the Hansen data were brought together in Global Forest Watch (GFW), an online forest monitoring and alert system launched in 2014 by a partnership fronted by the World Resources Institute. With regard to deforestation statistics, GFW has translated the advances of the Hansen dataset into an interactive platform, providing globally consistent, spatially explicit annual forest loss estimates from 2000 onwards.[6] While Brazil continues to monitor Amazonian deforestation with its own definitions under government programs, GFW currently provides the only publicly-available, regularly-updated, remote sensing-based annual quantification of national-level deforestation in Indonesia. GFW data have the added benefit of global consistency, meaning GFW forest loss figures for Indonesia are directly comparable to GFW figures for Brazil. A substantial amount of tree clearing in Indonesia occurs within plantations, however, so GFW forest loss data may not immediately indicate the conversion of natural forests. Margono et al. (2014) address this issue by layering the Hansen data with a map of primary forests in Indonesia, which they define as "mature forests of 5 ha or more in extent that retain their natural composition and structure and have not been completely cleared in recent history (at least 30 years in age)" (Supplement, 2). They provide annual estimates of primary deforestation in Indonesia in 2000-2012, showing that primary forest cover loss increased by an average of 476 km^2 per year during this period, and by 2012, primary deforestation in Indonesia exceeded deforestation in the Brazilian Amazon (Figure 1.1). GFW also provides estimates of the amount of forest loss occurring outside of plantations in Brazil and Indonesia in 2013 and 2014. These data indicate that in 2013-2014, loss of forests with over 30 percent canopy density outside of plantations in Indonesia averaged 7330 km^2 per year, while PRODES figures for Amazonian deforestation in 2013-2014 averaged 5452 km^2 per year.

[6] Global Forest Watch currently provides annual tree cover loss estimates through 2015.

The different definitions of forest in Indonesia as an administrative area and land use, and the lack of an ongoing and transparent government monitoring program for forest cover, have had myriad repercussions for forest policy and land use change. To give one example related to the control of deforestation, in 2010 the Government of Norway pledged up to $1 billion to support REDD in Indonesia. One of the conditions of the Norway agreement was an Indonesian moratorium on new concessions "for conversion of peat and natural forest" (Government of Norway/Government of Indonesia 2010, 3). Accordingly, in 2011, the Government of Indonesia announced a two-year moratorium on the issuance of new licenses in "primary natural forest" and peatlands (Government of Indonesia 2011a). The qualification of the moratorium by the Government of Indonesia to specifically 'primary' forests narrowed its potential scope, as Murdiyarso et al. (2011) note that a broader definition of 'natural forests' would have more than doubled the amount of forest area covered by the moratorium. Furthermore, 'primary natural forest' was not previously a forest category included in Indonesia's official forest classification system, which refers to allowable land uses as opposed to existing forest cover. Murdiyarso et al. report that the Ministry of Forestry interpreted 'primary natural forest' to mean areas where no forest use licenses had ever been issued. The moratorium was accompanied by an Indicative Moratorium Map, and launched a process of continual revisions to reflect actual land cover, concession status, and forest zoning, for which no harmonized official map has previously existed (P. Wells, Franklin, and Paoli 2011; Koh et al. 2011). Observers have hoped that this process will enhance data quality and transparency and support more targeted and accountable forest governance (Murdiyarso et al. 2011; Austin, Sheppard, and Stolle 2012).

My concern in this dissertation is with the broad range of ecological and social values related to forests. Most tropical forest conservation policy is directed at reducing primary forest

clearing and preserving 'old growth' forest. Accordingly, these policies and their effects are the principal focus of my research, but I endeavor throughout to situate these policies within broader dynamics of land use and land cover change across complex landscapes of agricultural and forest land uses and ecological succession.

What Drives Deforestation?

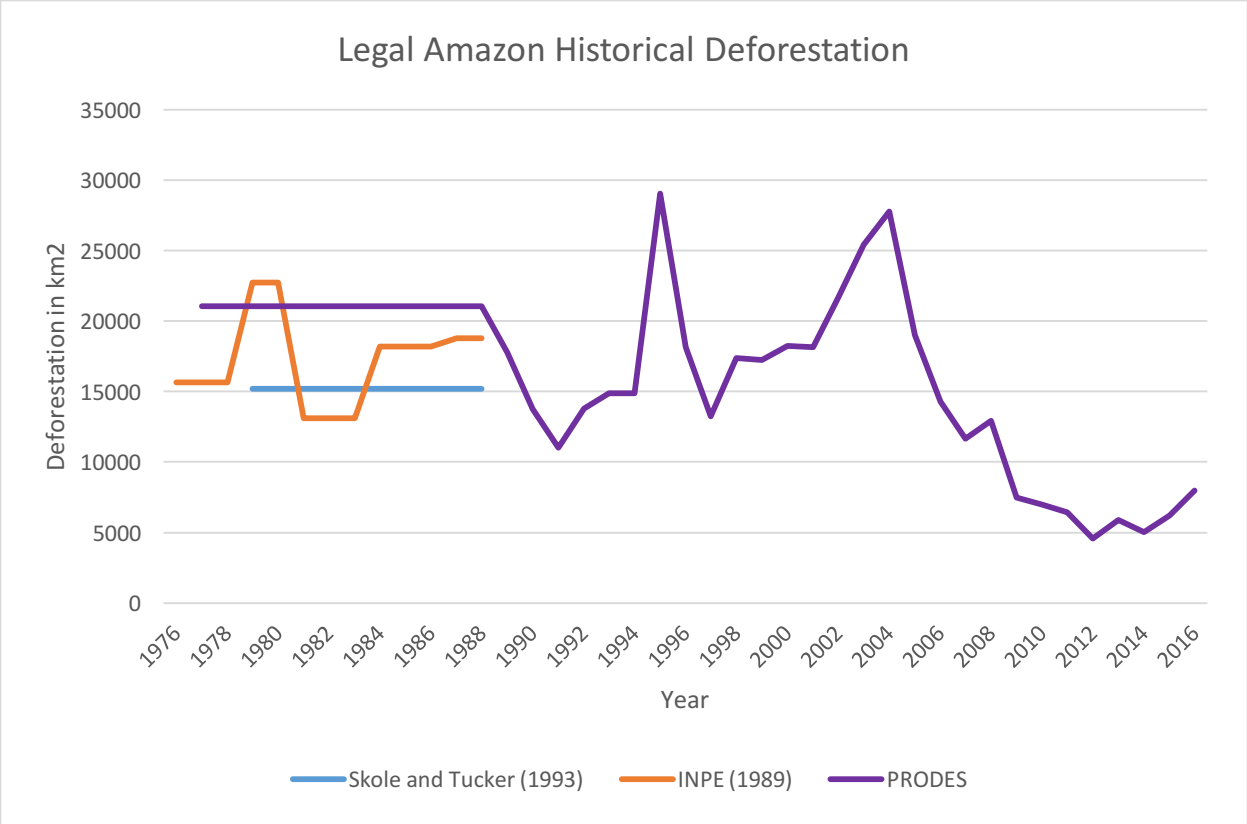
Since the Neolithic Revolution, agriculture has been the primary driver of anthropogenic deforestation (M. Williams 2006), and most tropical forest land cleared in modern times has been converted to agriculture (Ramankutty and Foley 1999; Gibbs et al. 2010; Sy et al. 2015). Agricultural expansion interacts with wood extraction and infrastructure extension as proximate causes of deforestation, which are determined by numerous underlying drivers including demographic, economic, technological, political-institutional, cultural, and environmental factors (Geist and Lambin 2002). Wheeler et al. (2011), for example, model Indonesian forest clearing with reference to prices and demands for palm oil and wood products, the exchange rate, the real interest rate, land-use zoning, forest protection status, the estimated opportunity cost of forest land, local governance quality, the poverty rate, population density, communications infrastructure, transport cost, local rainfall, and terrain slope.

Although international markets play a key role in structuring regional land economies (Wheeler et al. 2011; Lambin et al. 2001), policies and institutions also play a critical role at multiple levels in determining the economic geographies of infrastructure, forestry, and agriculture. Brazil, in particular, demonstrates how governance changes can strongly affect deforestation rates, as strong policies led to declines in deforestation in the late 2000s, despite increasing agricultural profitability (Assunção, Gandour, and Rocha 2012; Macedo et al. 2012). Deforestation is better understood, therefore, not as a simple economic question, but as a question

of political economy, or better still, political ecology. From this perspective, the geographies of capitalist production emerge through dialectical political and ecological relations. I elaborate on this perspective in my discussion of conceptual frameworks for socio-ecological research, but first I address the historical deforestation patterns and specific dynamics of agricultural frontier expansion in the Amazon and Kalimantan.

Historical Deforestation Patterns in Brazil and Indonesia

Remote-sensing based calculations of annual deforestation rates have only been available since the late 1980s in Brazil and the 2000s in Indonesia, but studies using Landsat imagery are able to produce historical baselines of forest cover stretching back to the mid-1970s (INPE 1989; Skole and Tucker 1993; Gaveau et al. 2014). (The first Landsat satellite was launched in 1972.) We can thus produce a hazy picture of historical deforestation rates stretching back to the early years of large-scale clearing in the Brazilian Amazon and Indonesian Borneo, which comes into sharper annual focus in 1988 in Brazil and in 2000 in Indonesia. The following figures compile data from remote-sensing based studies of deforestation in the Brazilian Amazon, Indonesia, and Kalimantan.


Legal Amazon Historical Deforestation
Deforestation in km2
35000
30000
25000
20000
15000
10000
5000
0
1976
1978
1980
1982
1984
1986
1988
1990
1992
1994
1996
1998
2000
2002
2004
2006
2008
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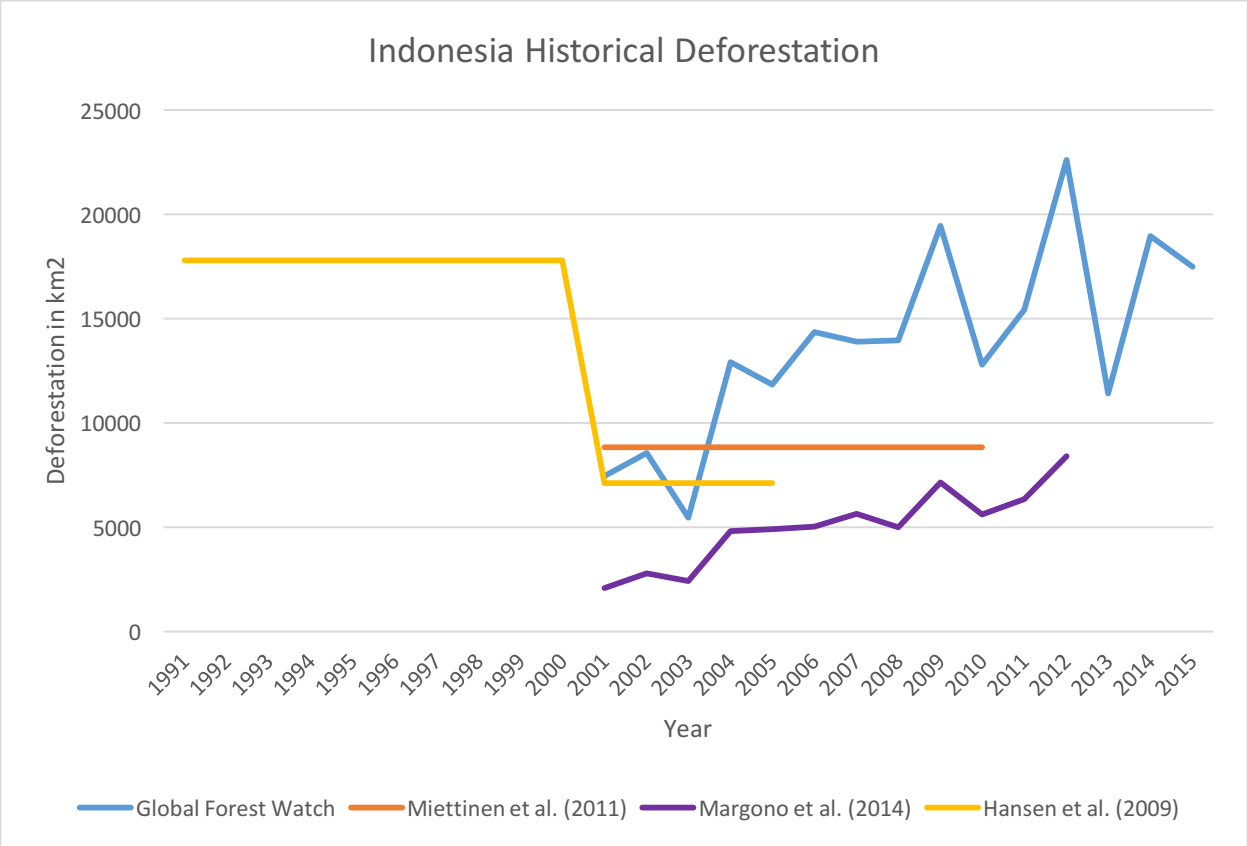
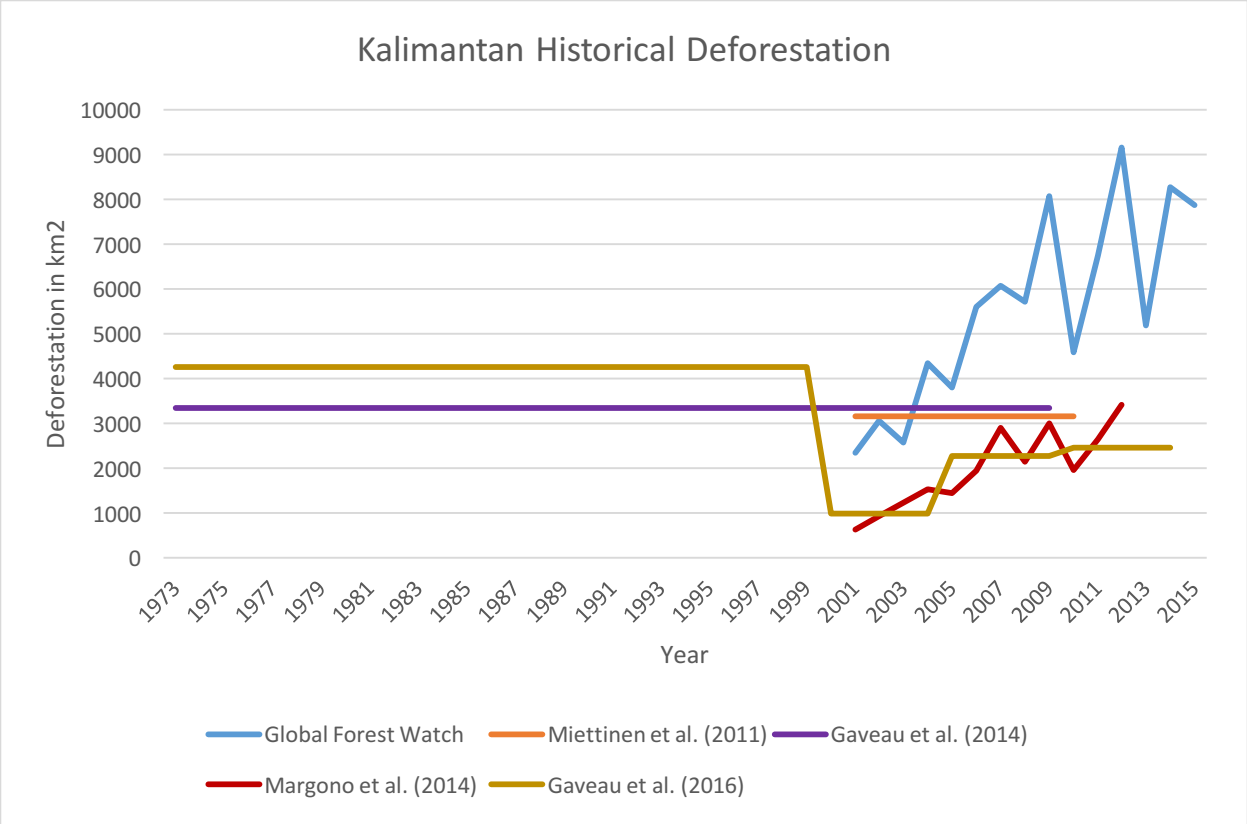
2016
Year
Skole and Tucker (1993)
INPE (1989)
PRODES


Indonesia Historical Deforestation
Deforestation in km2
25000
20000
15000
10000
5000
0
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
Year
Global Forest Watch
Miettinen et al. (2011)
Margono et al. (2014)
Hansen et al. (2009)



Figures 2.1-3: Historical deforestation in the Brazilian Amazon, Indonesia, and Indonesian Borneo, 2.1) Legal Amazon historical deforestation; 2.2) Indonesia historical deforestation; 2.3) Kalimantan historical deforestation.

These figures highlight several important points. First, they confirm that deforestation in the Amazon has since 2004 dropped to historically low levels, while deforestation in Indonesia, and in Kalimantan in particular, has accelerated during the 2000s to reach historically high levels. It should be noted that Indonesian deforestation figures from Margono et al. (2014) and Gaveau et al. (2016) that appear to constitute a lower estimate refer only to primary forest loss, whereas Global Forest Watch figures reflect all forest clearing on an annual basis, and Hansen et al. (2009), Miettinen et al. (2011), and Gaveau et al. (2014) reflect all forest loss across multi-year periods, which I have divided to give annual loss estimates. (Multi-year estimates from Gaveau et al. (2016) have also been divided for annual estimates.)

Second, Indonesian deforestation data for the 1990s are distorted by massive forest loss in 1997-1998 related to El Niño droughts and fires, which far exceeded the background rate of anthropogenic clearing (Fuller, Jessup, and Salim 2004; Hansen et al. 2009). The 1995 spike in Amazonian clearing was also caused by fires linked to El Niño conditions (Lindsey 2004). Macroeconomic conditions and political cycles contribute to fluctuations as well. Fearnside (2005) attributes the 1987-1991 decline in Amazonian deforestation to Brazil's economic recession, and Rodrigues-Filho et al. (2015) claim that the 1995 and 2004 spikes were partly driven by institutional instability associated with Brazilian presidential elections. Hansen et al. (2009) associate lower Indonesian deforestation rates in the early 2000s with reduced oil palm expansion in the aftermath of the Asian financial crisis and overthrow of the Suharto government. At the same time, the 1997-1998 fires had left ample deforested land open for plantation expansion, temporarily reducing pressures for new deforestation.

Variation in aggregate deforestation rates is a function of interwoven climatic, economic, and political factors. El Niño fires in Kalimantan and the Amazon, for example, are not purely 'natural' disasters. In the Amazon, El Niño years in the early 1990s may have left the forest more susceptible to fire, such that a spike in government-sponsored small farmer migration in 1995 led to widespread accidental burning beyond the usual levels of small farmer deforestation. In Kalimantan, unsustainable logging practices left forests severely degraded and more susceptible to drought and fire, which dramatically intensified the conflagrations of the 1997-1998 El Niño (Dauvergne 1998; Gellert 1998). Large-scale deforestation dynamics cannot be explained by discrete, independent variables; rather, they emerge out of complex socio-ecological systems. In both the Amazon and Kalimantan from the 1970s to the early 2000s, these systems were extractive political-economic regimes that drove high levels of deforestation, not in a linear fashion, but

rather through cyclical spikes and crashes within a secular trend of frontier expansion. After 2004, that extractive dynamic in Brazil began to shift, as the Brazilian land sparing complex sought to transform the Amazonian economy from a mode of extraction to a mode of production. This transformation is reflected in the decline in Amazonian deforestation rates to levels far below the historical extractive baseline.

Agricultural Development, Deforestation, and Land Sparing

In both Brazil and Indonesia, the majority of deforested land is converted to agriculture. In the Brazilian Amazon, deforested land is converted primarily to cattle pasture. The Brazilian Agricultural Research Corporation's (Embrapa) TerraClass project found that 62 percent of Amazonian land deforested up to 2008 was under pasture (Embrapa 2011), while Margulis (2004) estimates that pastures may occupy up to 88 percent of deforested area in the Amazon, a figure consistent with Sy et al.'s (2015) national-level finding that in 1990-2005, 82 percent of deforested land in Brazil was converted to pasture. The expansion of the ranching frontier in Brazil is driven in part by the expansion of the industrial field agriculture frontier, particularly soy cultivation (Arima et al. 2011; Richards, Walker, and Arima 2014; Richards 2015). Most deforested land is not converted directly to soy; rather, soy cultivation expands in former pasture areas, and the effect of soy production on regional land markets and the displacement of cattle ranching push the ranching frontier deeper into the Amazon.

In Kalimantan, industrial logging usually precedes forest conversion for oil palm or tree fiber plantations, while roughly a third of deforestation is due to other agricultural activities, including clearing by smallholders. Abood et al. (2015) find that 66 percent of forest loss in Kalimantan in 2000-2010 occurred in industrial concessions for tree fiber, oil palm, logging, and mining, with 23 percent of forest loss in oil palm plantations. This percentage for oil palm is

consistent with Carlson et al. (2012), who report that in 2007-2008, 27 percent of deforestation in their West Kalimantan study region was for oil palm.

Under the extractive regimes that have operated since the 1970s, industrial agricultural production in both the Amazon and Kalimantan has been closely linked to deforestation. This relationship continues in Kalimantan, where in 1990-2010, 90 percent of lands converted to oil palm were forested (Carlson, Curran, Asner, et al. 2012). Oil palm yields on large plantations in Indonesia have increased only marginally since the mid-1990s. Figure 2.4 shows that the increase in palm oil production in Indonesia since 2000 has been closely correlated with the expansion of plantation area, and both are positively correlated with Indonesia's increasing deforestation rate.

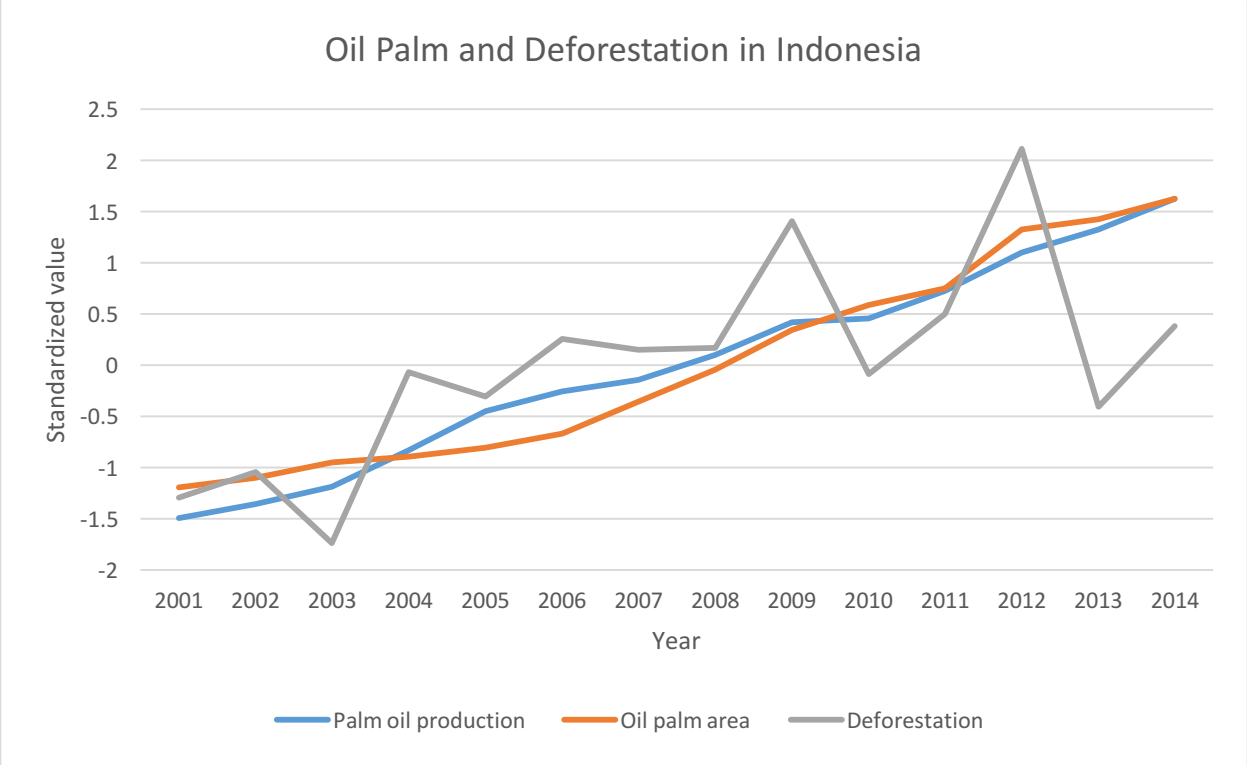


Figure 2.4: Oil palm area, palm oil production, and deforestation in Indonesia. Increases in production are driven by expansion as opposed to yield increases, and expansion drives increasing deforestation. Palm oil production on large plantations in metric tons is from BPS (2017b), oil palm area on large plantations in hectares is from BPS (2017a), forest loss at >30 percent canopy density in square kilometers is from Global Forest Watch (Hansen et al. 2013), all values have been standardized for comparison.

In the Amazon, rising soy and cattle production were correlated with increasing deforestation until 2004, when new governance measures coincided with a dive in commodity prices, and deforestation and soy production both declined. After 2006, however, commodity prices recovered and soy and cattle production increased, while deforestation continued to decline. Macedo et al. (2012) describe a 'decoupling' of soy production from deforestation in Mato Grosso State after 2006 as yield increases comprised a greater proportion of production growth, cropland expansion became concentrated almost entirely on previously cleared land, and pasture expansion declined significantly. This dynamic of declining deforestation and rising agricultural production occurred at a regional scale. Figure 2.5 shows the standardized relationships between deforestation, soy production, and the size of the cattle herd in Pará State in 1990-2015, where as in Mato Grosso, soy and cattle production increased after 2007 while deforestation declined.

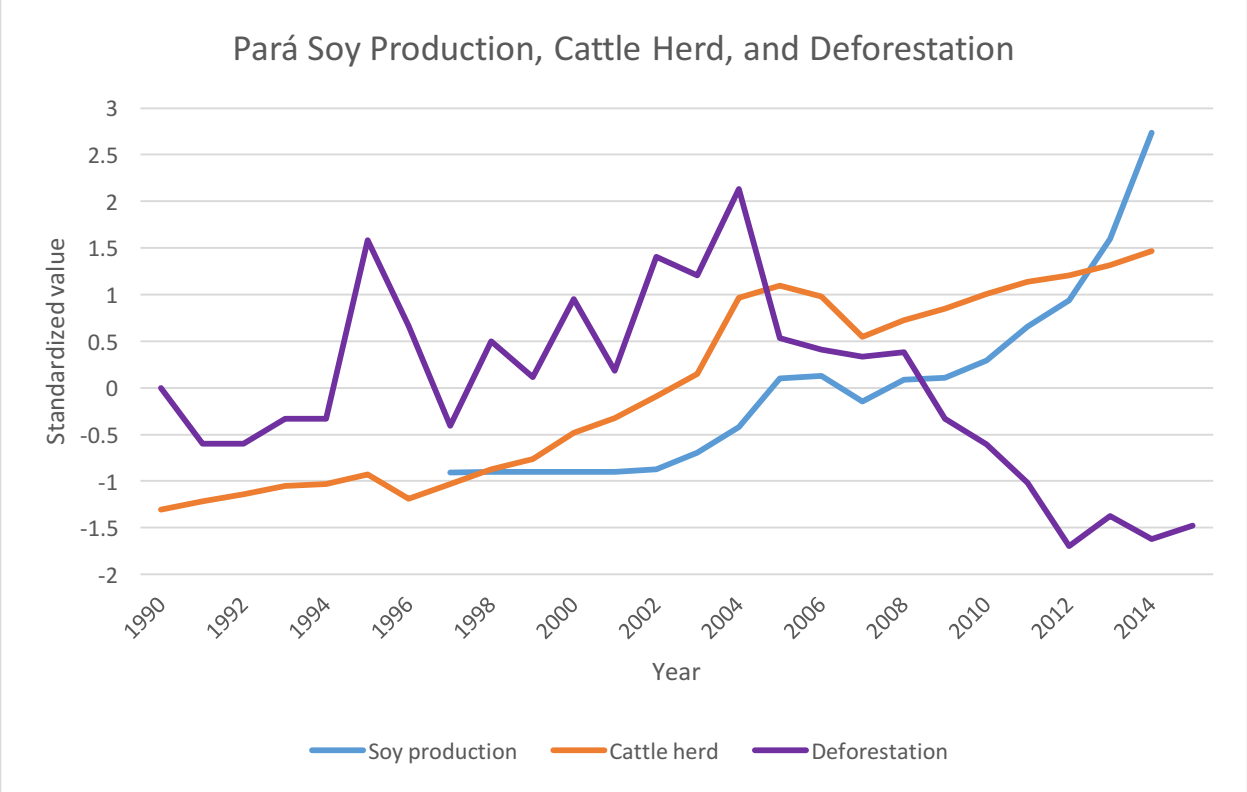


Figure 2.5: Soy, cattle, and deforestation in Pará. Soy production in metric tons is from IBGE (2016d), cattle herd in number of head is from IBGE (2016c), deforestation in square kilometers is from INPE (2017), all values standardized for comparison.

Increasing agricultural production concurrent with decreasing deforestation in the Brazilian Amazon has been considered an example of land sparing (Macedo et al. 2012; Arvor et al. 2012; Brando et al. 2013; Nepstad et al. 2013; Oliveira and Hecht 2016), which posits that agricultural intensification can spare land for environmental conservation. Land sparing has become the lens through which the Brazilian land use transition is explained (Lapola et al. 2013), as well as the policy prescription that government, NGO, and academic actors take as the lesson of the Brazilian experience. While it is clear that Amazonian deforestation has declined, agricultural production has increased, and ranching and cropland intensification has occurred in some areas, it is unclear that cattle production has decoupled from deforestation at the regional level. The rate of cattle herd expansion in the Amazon slowed after 2004, and the Legal Amazon added fewer cattle per hectare deforested in 2005-2014 than in 1995-2004 (IBGE 2016c; INPE 2017). Large-scale deforestation continues for the establishment of extensive ranching operations, but the primary driver of these operations in many cases is not cattle production, but rather land speculation (Hecht 1985; Hecht 1993; Bowman et al. 2012). The relationship between agricultural intensification and deforestation is more complex than the 'land sparing' narrative reveals, and I explore the construction of the narrative and the messy realities in which it is applied in subsequent chapters.

It is crucial to recognize, furthermore, that agricultural development, deforestation, and forest governance in Brazil and Indonesia are globalized phenomena. Brazil is the world's largest soy exporter, sending roughly half of its soybean harvest abroad, and the country is responsible for nearly a fifth of global beef exports. Indonesia is the world's largest palm oil exporter, and

exports roughly 70 percent of its production (USDA Foreign Agricultural Service 2017). The agro-forest frontier in these countries develops through 'telecouplings' with distant markets (Liu et al. 2013); for example, the liberalization of Chinese soybean imports spurred export-oriented soy production in the Brazilian Amazon (Oliveira and Schneider 2016), while EU targets on the use of biofuels for renewable energy have helped drive increasing demand for Indonesian palm oil (Pye 2010; Neslen 2016). These globalizing processes are mediated by powerful transnational corporate, intergovernmental, and NGO actors. Four multinational companies – Archer Daniels Midland (ADM), Bunge, Cargill, and Louis Dreyfus – have controlled over 50 percent of Brazilian soybean crushing capacity since the early 2000s (Oliveira and Schneider 2016). Cargill and ADM are also major traders of Indonesian palm oil, which is often grown by plantation conglomerates such as Singapore-based Golden Agri-Resources and sold to consumer goods manufacturers such as Unilever, which purchases as much as 5 percent of Indonesia's palm oil production (Greenpeace 2008). Bilateral cooperation organizations such as USAID and Norway's International Climate and Forest Initiative, transnational environmental NGOs such as The Nature Conservancy and WWF, and intergovernmental conventions and organizations such as the UNFCCC and the World Bank all seek to influence and govern tropical agricultural production and environmental conservation. An explanation of agricultural development and forest governance in Brazil and Indonesia, and an evaluation of land sparing claims, must therefore take account of global processes. The following sections consider conceptual frameworks and methodologies for the study of tropical deforestation and global environmental governance.

Conceptual Frameworks and Methods for Global Environmental Governance Research

The Great Acceleration in human activity and environmental change since 1950 heralds a new era in the history of humanity, the biosphere, and the planet (Steffen et al. 2015). Socio-ecological processes are interconnected through flows of increasing volume and velocity across great areas and distances. Global environmental politics determine how these processes and flows are directed and governed, and how benefits and burdens are distributed. The socio-ecological revolution of the Great Acceleration implies a revolution in global environmental politics. Scholars have responded to these revolutions with new concepts and methods for studying power and change in a 'globalized' world. I review some methodological approaches to the study of global environmental politics and then discuss incorporated comparison and ethnography of transnational organizations as research methodologies capable of overcoming some of the challenges of 'global' research and illuminating multilevel and telecoupled socio-ecological phenomena.

Global Environmental Governance

'Globalization' describes transformations in the geographical organization of life on Earth that accompany the Great Acceleration in human activity. Globalization occurs through the deterritorialization and reterritorialization of socio-ecological relations, as territorial structures such as the nation-state are simultaneously transcended and reconstructed (Brenner 1999). Within this dynamic, we have come to possess an idea of 'the global' in our natural and social worlds (cf. Tsing 2000b). In the realm of the natural and earth sciences, we build global biodiversity maps and climate models, helping us comprehend phenomena from species invasions to El Niño. In the social, economic, and political realms, the increasing volume and speed of flows of information, symbols, capital, commodities, and people is articulated through constructs of global society, the global economy, and global governance (Kearney 1995).

'Governance' encompasses the reconfiguration of political authority that coincides with the reterritorializations of globalization. Governance is both the sum of governmental arrangements or structures of rule within a socio-political system, and more specifically, an expression of the shift in the exercise of authority from the state ('government') to a heterogeneous array of political actors, including international organizations, NGOs, and corporations ('governance') (Paterson, Humphreys, and Pettiford 2003; Jordan, Wurzel, and Zito 2003; Himley 2008). Governance takes a multitude of forms. In the environmental field, governance measures include commodities roundtables and eco-certifications; 'zero deforestation' pledges, moratoria, and other voluntary agreements; and voluntary carbon markets (Cashore 2002; Jordan, Wurzel, and Zito 2003; Lemos and Agrawal 2006; Brannstrom et al. 2012).

Governance structures may be voluntarist, constituted through multi-stakeholder cooperation or public-private partnerships (James McCarthy and Prudham 2004; Castree 2010b), yet they often remain closely articulated with government authority (Ferguson and Gupta 2002; Sawyer 2004). In practice, the boundaries of the 'state' are mutable. As Mitchell notes, the state/society distinction is "a line drawn internally within the network of institutional mechanisms through which a social and political order is maintained" (1991, 78). The move from government to governance may allow actors to circumvent unwieldy bureaucracies and political struggles, and by the same token it may allow them to circumvent some forms of public accountability (Cashore 2002; P. Jepson 2005). The prevailing neoliberal order is characterized by variegated forms of 'hybrid governance' and 'co-governance' that blur the lines of 'state' rule by diffusing authority across government and parastatal agencies, corporations, NGOs, and organized 'civil society' (Lemos and Agrawal 2006; Brenner, Peck, and Theodore 2010; D'Alisa and Kallis 2016).

Globalization and governance are two faces of the systemic socio-ecological transformation towards global capitalism that is the motor of the Great Acceleration. Capitalism, as Jason Moore argues, is an ecological regime: a historically stabilized set of market and institutional mechanisms that ensure the extraction and consumption of surpluses of energy, food, raw materials, and labor (Moore 2010b, 392). The capitalist ecological regime expands through cyclical phases of crisis and revolution that reconfigure socio-ecological circuits of accumulation (Moore 2000). Globalization and governance are elements in the appropriation of socio-ecological surplus at a planetary scale under the contemporary regime of global capitalism (Robinson 2004), where accumulation is unbound from national territories and biogeophysical thresholds.

'Global environmental governance' thus refers in the broadest sense to this systemic reordering of political-economic and ecological relations, and also more specifically to the political project of governing the socially-constructed 'global environment' (Tsing 2000b) through institutional mechanisms such as the Rio Conventions, the United Nations Environment Programme, and international conservation initiatives.

Frameworks and Methods for Studying Global Environmental Governance

A world of heightened interconnections, flows, and telecouplings[7] poses new challenges for scientific research. It collapses both disciplinary boundaries and territorial units of analysis. Scholars have responded by experimenting with new conceptual frameworks and methodologies. These frameworks can be divided into two broad categories: institutionalist approaches and systems approaches. Institutionalist approaches are more oriented toward the political project of

[7] Telecouplings are "socioeconomic and environmental interactions between coupled human and natural systems over distances" (Liu et al. 2013). The concept is intended to link environmental teleconnection and human globalization in a unified socio-ecological framework.

governing the environment, while systems approaches explore the general reordering of political-economic and ecological relations.

Institutionalist Approaches

Institutionalist approaches are associated with a narrower definition of 'global environmental governance' rooted in political science and especially international relations scholarship related to international environmental politics. O'Neill et al., for example, define the study of global environmental governance as "a problem-driven field with roots in political science and international relations (IR) theory relevant for improving global governance of the environment" (2013, 442). Lemos and Agrawal similarly view environmental governance through an institutional lens as a "set of regulatory processes, mechanisms and organizations," though they are attentive to the political-economic relationships that institutions embody (2006, 298). Within this institutionalist perspective, an important subfield comprises research on 'multilevel governance,' which draws on frameworks developed for the study of European Union politics (Bache and Flinders 2004) as well as work by Elinor Ostrom and her collaborators on governance of complex common-pool resource systems (Dietz, Ostrom, and Stern 2003; Brondizio, Ostrom, and Young 2009). The Center for International Forestry Research (CIFOR) has been prominent in developing multilevel governance analyses of forest management, especially within its Global Comparative Study on REDD+[8] (Mwangi and Wardell 2012; Saito-Jensen 2015; Ravikumar, Larson, et al. 2015). The common thrust of institutionalist approaches is the search for institutional design 'solutions' to environmental governance 'problems' that engage government and non-state actors across multiple levels and scales. The literature thus has a tendency to 'render technical' (Li

[8] REDD+ adds sustainable forest management and enhancement of forest carbon stocks to efforts to reduce emissions from deforestation and forest degradation (REDD).

2007b) questions of governance in order to offer policy prescriptions, slipping at times into what Stubbs describes as a 'realist modernism' (2005, 66; see also Saito-Jensen 2015) fixated on 'problem-solving' at the expense of 'problematizing.'

Methodologies deployed by scholars working in an institutionalist framework are generally geared toward the positivist definition of key variables and identification of causal effects and causal mechanisms (O'Neill et al. 2013; Saito-Jensen 2015). While many social science methods can contribute to either empiricist or interpretative research, some such as case studies and statistical analysis lend themselves more readily to positivist, variable-based research, while others such as ethnography and participatory mapping lend themselves to interpretative or relational analyses. O'Neill et al. (2013) highlight four characteristics of global environmental governance that pose challenges for 'problem-driven' research, namely high levels of complexity and uncertainty in socio-ecological systems, vertical linkages across multiple governance levels, horizontal linkages and overlaps of issue areas and governance regimes, and the fluid and evolutionary character of problem sets and institutional initiatives. Institutionalist scholars deploy a variety of research designs and qualitative and quantitative methods to address these challenges, including comparative case studies, 'fuzzy set' analysis, collaborative event ethnography, participatory action research, construction of global statistical databases, network analysis, and model- and scenario-building. Researchers frequently employ multiple methods in an attempt to 'triangulate' in order to gain greater analytical leverage over a particular problem or question (O'Neill et al. 2013).

A prime example of institutionalist global environmental governance research methodology is offered by CIFOR's research program on "Multilevel Governance and Carbon Management at the Landscape Scale" (Ravikumar, Kijazi, et al. 2015), part of the organization's

Global Comparative Study on REDD+. The Multilevel Governance research program "examines how institutions of different levels and sectors relate [to] each other in decision-making processes around land use, carbon management and benefit-sharing arrangements" (CIFOR 2014) in order to "propose principles and options to improve the design of multilevel institutions, processes and tools in the implementation of REDD+ and other land use policies," in the words of a CIFOR scientist (pers. comm. 25 July 2013). The program adopted a multilevel comparative case study design. The case selection included five different countries, at least two regions or provinces in each country, and multiple cases within each province or region that contrasted sites with increasing deforestation with sites with initiatives to reduce deforestation, whether or not through REDD+. This nested design yielded 54 case study sites where researchers intended to combine the collection of quantitative data on carbon stocks and emissions with key informant interviews on governance and land use, ethnographies of land change practices and decision making, surveys on benefit sharing, and carbon and land use modeling and scenario building (CIFOR 2014; Ravikumar, Kijazi, et al. 2015). In practice, the research activities focused most heavily on key informant interviews and participatory scenario building (Ravikumar, Kijazi, et al. 2015; Myers et al. 2016; Ravikumar et al. 2017). In a methodological innovation, interviews included an 'articulation' section eliciting information about perspectives and actors that played a key role in determining the informant's land use decision making, as a tool for mapping the multilevel governance assemblage and identifying additional interviewees (Ravikumar, Kijazi, et al. 2015, 11).

Products of CIFOR's Multilevel Governance program to date include overviews of the legal and institutional frameworks of REDD in the study countries (e.g., Myers et al. 2016) and comparative analyses of design issues such as the challenges of jurisdictional versus project-based

initiatives or the relative role of carbon finance in land use change (e.g., Ravikumar, Larson, et al. 2015). These studies often include substantial analyses of the role of power and economic interest in structuring multilevel interactions and determining land change outcomes, but through their very attentiveness to underlying political and economic forces they reveal the limitations of their institutionalist framework. Myers et al., for example, in their analysis of multilevel governance and REDD+ in Indonesia, acknowledge that "[s]olutions… are unlikely to be effective without addressing the underlying drivers of deforestation in Indonesia, which are tied to broad economic goals" (2016, ix), yet their recommendations are still focused on improving communication, participation, and accountability of governance initiatives rather than addressing underlying drivers. Paradoxically, they are offering solutions that they recognize are unlikely to be effective.

As this example illustrates, institutionalist research takes as its object of inquiry a particular institutional assemblage (e.g., REDD), and that assemblage also tends to define the boundary of the inquiry. Thus, even an institutionalist research approach that is highly "contextual, culturally located, historically grounded, and politically sensitive" (Saito-Jensen 2015, 19) inevitably reflects back on questions of institutional design and 'good governance' as a normative goal, without being able to effectively critique the socio-political, economic, and ecological relations with which governance intertwines. In its more extreme ramifications, this limitation of the institutionalist literature can lead to research that naturalizes institutional structures, elides power differentials, and technifies and depoliticizes socio-ecological conflicts.

Systems Approaches

Systems approaches, by contrast, are less narrowly focused on contributing to the political project of governing the environment, though they may still offer policy prescriptions. These approaches begin, however, with an effort to understand the broader dynamics of political-

economic and ecological relations. Researchers use a variety of frameworks to study socio-ecological systems (Binder et al. 2013). Work in the Ostrom institutionalist tradition is now often styled as 'social-ecological systems' analysis (Ostrom 2009), although this framework remains fundamentally concerned with the design of governance institutions, reimagined as "adaptive governance in complex systems" (Dietz, Ostrom, and Stern 2003, 1908).

The panarchy framework is a holistic systems approach rooted in ecological theory (Holling 1973; Gunderson and Holling 2002). 'Panarchy' describes a socio-ecological system as a set of adaptive cycles nested at multiple spatio-temporal levels, from the rapid changes in a garden plot to the long-term transformation of a landscape. The concept of system resilience (i.e., the ability of a system to recover or reorganize in response to disturbances) is critical to an understanding of adaptive cycles. With respect to governance, this concept has been taken up by a 'resilience' literature that integrates social and institutional dynamics in analyses of system thresholds and regenerative capacity (Folke 2006; P. Olsson, Galaz, and Boonstra 2014). The resilience literature clashes with much of contemporary social science thinking, however, as its framework of self-organizing systems is deeply functionalist and overshadows agency, conflict, and power. When taken up by political actors, resilience theory tends to converge with institutionalism in an alignment with neoliberal principles of self-organization and functionalist coordination that naturalizes and depoliticizes social and institutional relations (L. Olsson et al. 2015).

The resilience and institutionalist approaches have been integrated in recent years into the emerging field of 'sustainability science.' Sustainability science serves as an umbrella for 'use-inspired,' 'problem-driven' research on coupled human-environment systems that has an overarching normative commitment to 'sustainable development' (W. C. Clark 2007; Kates 2011).

Sustainability science integrates a variety of social-ecological systems approaches, and generally combines research in the natural sciences with policy and management perspectives (Bettencourt and Kaur 2011). Despite its integrated socio-ecological approach, sustainability science research has often been limited to local or regional scales. Liu et al. (2013) argue that globalization, which they define as "socioeconomic interactions between human systems over distances," and teleconnections, defined as "environmental interactions between natural systems over distances," require a new research framework for sustainability studies. They advocate a 'telecoupling' framework for the study of "socioeconomic and environmental interactions between coupled human and natural systems over distances." Using the example of the soybean trade between Brazil and China, they provide a number of analytical tools for examining the causes, effects, flows, and spillovers of the soy trade telecoupling, and they argue that governance approaches must be attentive to telecouplings or operate at the scale of the telecoupled system in order to avoid negative feedbacks and spillovers. Conducting research with a telecoupling framework calls for a network perspective emphasizing multi-site connections and integrated systems, and Liu et al. advocate cross-system collaborations among researchers and the pursuit of methodologies such as network analysis, telecoupled agent-based modeling, and systems modeling.

An alternative to the sustainability science systems approach is offered by world systems analysis, which opposes functionalism and depoliticizing normalization with a critical political-economic perspective. Scholars working in environmental history, geographical political economy, and environmental sociology have drawn on thinkers such as Marx, Polanyi, Braudel, and Wallerstein to develop approaches to studying socio-ecological change that think dialectically about power, conflict, and biophysical processes (Martínez-Alier 1987; O'Connor 1988; Friedmann and McMichael 1989; Hornborg 1998; Foster 1999; Moore 2000; Foster and Holleman

2014). One field of scholarship employing a dialectical systems perspective comprises historical research under headings such as environmental history and historical sociology, which relies heavily on historical methods such as archival research. A second field of scholarship tackles more contemporary phenomena, including questions of globalization and environmental governance in the time of the Great Acceleration.[9] Here there is a particularly rich subfield of 'political ecology' that links questions of natural resource use and access to processes of political-economic contestation (Watts and Peet 2004).

Political ecology traditionally roots itself at the 'local' level (Brown and Purcell 2005), seeking to understand the environmental and political-economic factors that structure the decision making of resource users (Blaikie and Brookfield 1987). In terms of research methodology, political ecology classically proceeds by "examining first the resource-related actions of local people and then linking them both to their webs of local social relations and to the broader political-economic setting" (Peluso 1992b, 51). This approach is similar to the method of 'progressive contextualization' developed in human ecology by Vayda, which involves "focusing on significant human activities or people-environment interactions and then explaining these interactions by placing them within progressively wider and denser contexts" (1983, 265). In political ecology, there is a more individualist focus on how actors are embedded in social relations that structure their resource use and access, and there is an assumption that the actions of local resource users can only be understood through their relations to larger social structures and political-economic processes (Peluso 1992b). This perspective led to a method of 'chains of explanation,' which move from a consideration of resource managers in direct relation to the environment, to the relations of

[9] These distinctions are heuristic, and in reality historical scholarship and more contemporary research blur together.

resource managers with each other and other social groups, to the relations of resource managers and their society with the state and the world economy (Blaikie and Brookfield 1987, 27).

Researchers working in the political ecology tradition often draw on multiple kinds of data to develop their contextualized explanations of resource use and access. Rocheleau (1995), for example, in her study of a social forestry program in the Dominican Republic, deployed a suite of methods including focus groups, key informant interviews, oral histories, labor calendars, participatory mapping, and a standardized, randomly-sampled questionnaire survey, and concluded that empiricist and interpretative approaches combining qualitative and quantitative methods could be brought together in a productive synthesis to reveal gendered social structures and patterns of resource management. Doolittle (2010) similarly recounts her strategy of combining archival research, oral histories, participant observation, household economic journals, and participatory mapping to study native property rights and resource management in Malaysian Borneo.

As globalization has become more pervasive, both materially and conceptually, the 'chains of explanation' approach has been criticized as encouraging overly simplistic linear or hierarchical thinking (Doolittle 2010), and the focus on the 'local' as a level of analysis has been criticized as reifying scale to catch political ecology in a 'local trap' (Brown and Purcell 2005). Seeking new analytical tools for exploring complexity and connection, political ecology scholars have moved from 'chains of explanation' to an exploration of networks or 'webs of relation' (Rocheleau and Roth 2007), and to explicit theorizations of scale and the articulations of local resource use with the capitalist world system in a move toward 'global political ecology' (Peet, Robbins, and Watts 2011). At the global level, political ecology blurs with human-environment geography and geographical political economy, with which it shares foundations in ecological Marxist analysis

and dialectical systems thinking, though political ecology scholarship continues to be distinguished by a commitment to fieldwork and examination of the agency and decision-making of specific actors, even in 'global' analyses.

Global environmental governance has become a central problematique across these interlinked subfields, due to their shared preoccupation with what Himley (2008) describes as "the nexus of nature and neoliberalism." From the dialectical, systemic perspectives of geography and political ecology, research on global environmental governance seeks to "analyze how processes of neoliberal globalization have entailed – indeed, have been predicated on – a radical reconfiguration of the organizational and institutional arrangements through which society-environment relations are governed… [stressing] the interests served by these reconfigurations as well as how governance arrangements are contested and struggled over by differentially empowered social and political actors" (Himley 2008, 434). This formulation stands in stark contrast to institutionalist approaches that attempt to 'improve' governance without analyzing neoliberal globalization, or sustainability science approaches that attempt to govern globalization without critiquing it.

In addition to the already diverse methodological toolbox of political ecology, two methodological innovations stand out as strategies for conducting global research, including global environmental governance research, from a dialectical perspective. The first is the method of 'incorporated' or 'relational' comparison, which builds on sociological critiques of positivist comparative methods by the likes of Tilly and Wallerstein. As McMichael (1990) argues, "global conceptions of social change violate formal comparative requirements" of case independence and uniformity (385), so the goal of comparative historical inquiry should be "not to develop invariant hypotheses via comparison of more or less uniform 'cases,' but to give substance to a historical

process (a whole) through comparison of its parts" (386). He defines 'incorporated comparison' as a strategy that "progressively *constructs* a whole as a methodological procedure by giving context to historical phenomena. In effect, the 'whole' emerges via comparative analysis of 'parts' as moments in a self-forming whole" (386, original emphasis). Incorporated comparison has been further developed by Hart (2006) under the rubric of 'relational comparison.' Following Lefebvre's (1991) work on the social production of space, Hart maintains that "place is most usefully understood as nodal points of connection in wider networks of socially produced space" (994), this conception "moves us beyond 'case studies' to make broader claims – it enables, in other words, a non-positivist understanding of generality. In this conception, particularities or specificities arise through *interrelations* between objects, events, places, and identities; and it is through clarifying how these relations are produced and changed in practice that close study of a particular part can generate broader claims and understandings" (996, original emphasis). Incorporated or relational comparison, in other words, enables inquiry into interconnected phenomena that emerge in dialectical relation with generalized, systemic processes, and so constitutes a comparative method for dialectical systems approaches to global research.

A second methodological innovation for dialectical global studies is 'global ethnography.' Ethnography seeks to understand the culture of a particular group – to see the world through the eyes of others – and traditionally relies on participant observation as a foundational method. Ethnographic methods have a key role to play in environmental governance research. As Himley (2008) argues, "through critical ethnographic methods, geographers will gain a fuller and more nuanced understanding of how actual resource/environment decisions are being made, by whom, for whose benefits, and within the contexts of what power asymmetries" (446–447). A small but increasing number of ethnographies of environmental governance have made important

contributions to scholarly understanding of topics including environmental governmentality, environmental regulation and governance assemblages, conservation science and practice, and the role of environmental governance in capital accumulation and class formation (Rival 2003; Agrawal 2005; West 2006; Li 2007b).

Global ethnography offers a methodology for the ethnographic study of globalized environmental governance phenomena. Championed by Michael Burawoy and his collaborators, global ethnography develops the approach of 'multi-sited ethnography' (Marcus 1995) to investigate the "production of globalization" (Burawoy 2001, 150). The 'site' or 'field' of global ethnography is the 'place-making projects' of globalization that define new kinds of places and social relations. For Gille and Riain (2002), "[b]y locating themselves firmly within the time and space of social actors 'living the global,' ethnographers can reveal the socioscapes that people collectively construct of global processes" (271). In this approach, "place becomes a launching pad outward into networks, backward into history and ultimately into the politics of place itself" (287). Anna Tsing's book *Friction: An Ethnography of Global Connection* (2005) demonstrates the utility of global ethnography for research on global environmental governance. Tsing explores the networks and processes through which forest conservation and landscape change occur in the rainforests of Indonesian Borneo, producing insights into how the globalizing aspirations of capitalism, science, and politics are "charged and enacted in the sticky materiality of practical encounters" (1) around forest destruction and environmental advocacy.

Global ethnography poses a number of challenges for the practitioner, however. Defining the contours and limits of the 'field' out of a complex, multi-sited network stands as a critical analytic, strategic, and practical concern. Ethnographic practice also shifts: as "the methodological imperative of being there is replaced by that of chasing things around" (Gille and Riain 2002, 286),

global ethnographers may spend less time "just hanging around" (Fenno 1978) conducting participant observation and rely more heavily on methods such as interviews, network mapping, and documentary and archival research. As Tsing writes, "My knowledge is variously ethnographic, journalistic, and archival, and it is formed in discrete patches. …The only ways I can think of to study [global connections] are patchwork and haphazard. The result of such research may not be a classical ethnography, but it can be deeply ethnographic in the sense of drawing from the learning experiences of the ethnographer" (2005, x–xi).

Table 2.1: Frameworks and Methods for Global Environmental Governance Research

Conceptual Frameworks		**Methodological Innovations**
Institutionalism		Nested Comparison, Triangulation, Articulation, Fuzzy Sets
Systems	Sustainability	Telecouplings
	Dialectics	Incorporated Comparison, Global Ethnography

Empire from the Inside: Organizational Ethnography for Global Research

Organizational ethnography of transnational organizations is capable of addressing some of the challenges of global ethnographic research while taking researchers inside the major organizations participating in the construction of global environmental governance. While much of the classic scholarship in international relations and international environmental politics took the state as the unit of analysis, the shift from government to governance under neoliberal globalization has enhanced the importance of intergovernmental, non-state and parastatal actors in international politics and led to an increasing scholarly interest in the governance functions of groups such as international advocacy networks, multinational corporations, and NGOs (Keck and Sikkink 1998; Ruggie 2004; Heins 2008). The key actors in globalization and global governance

are organizations, from state and international bureaucracies to corporations to NGOs, and so organizational ethnography has become an important approach contributing to the endeavor of global ethnography.

The method of organizational ethnography, i.e., "ethnography in and of organizations" (Eberle and Maeder 2011, 53), is usually traced back to the Hawthorne Studies of the 1920s and 1930s, which took place at the Western Electric Hawthorne Plant in Illinois. These studies launched an anthropological focus on industrial organizations that gave rise to the field of organizational behavior (H. B. Schwartzman 1993; Bate 1997). After World War II, organizational ethnographers in sociology and anthropology turned their attention to public bureaucracies, and the 1960s inspired an interest in social movement organization. From the 1970s onwards, organizational ethnography proliferated as part of a growing field of the 'anthropology of work' (H. B. Schwartzman 1993), which describes the cultures and lived experiences of work in capitalist society.[10] At the same time as organizational ethnography offers a window inwards on the cultures of organizations, it can also be used to reflect outwards on the social processes in which organizations participate. Michael Burawoy's (1979) *Manufacturing Consent* provides a classic example of this strategy, as Burawoy uses his experiences on the shop floor in a Chicago factory to illuminate broad transformations in the capitalist labor process.

Organizational ethnography thus can serve to explore the constitution of political-economic processes through the experiences, understandings, relations, and interactions of individuals within and across the membrane of an organization. In this capacity, organizational ethnography becomes especially useful to the endeavor of global ethnography.[11] Given the

[10] For further discussions of organizational ethnography in this tradition, see Neyland (2008) and Ybema et al. (2009).

[11] Ethnographic approaches that share certain key elements of the organizational ethnographic perspective include 'institutional ethnography,' which builds on the work of Dorothy Smith to explore institutionalized interactions,

proliferation and importance of organizations participating in the construction of globalization and global governance, organizational ethnography offers simple solutions to some of the basic challenges of global ethnography, such as defining the 'field' and gaining access at multiple levels and sites. In an ethnography of a transnational organization, the field is the organization itself or some combination of its components, and when access is gained at one site or level of the organization, it facilitates access across the organizational network, allowing the researcher to travel along existing pathways of transnational connection.

Researchers have begun to produce ethnographies of global organizations that take advantage of these strengths. In the field of global environmental governance, in addition to collaborative event ethnographies of meetings of groups such as the International Union for Conservation of Nature (IUCN) (L. Campbell and Brosius 2010) and the Convention on Biological Diversity (CBD) (L. Campbell et al. 2014), notable organizational ethnographies include works by Michael Goldman (2005) and Catherine Corson (2016). Goldman's ethnography of The World Bank took him from "the belly of the so-called beast" in Washington, DC to "remote research institutes, run-down government agencies, international conferences, and mountain dam sites" (2005, xiii) to reveal how the Bank has integrated a mandate of environmental sustainability into a global project of "green neoliberalism" (5). Corson (2016) uses her experience working for the United States Government and especially the US Agency for International Development (USAID) to show how assemblages of public, private, and nonprofit actors came together to direct US

both within and beyond formal organizations (D. Smith 2002), and 'collaborative event ethnography,' in which a group of researchers works together to create an ethnography of a complex event, such as an international environmental conference (L. Campbell and Brosius 2010; L. Campbell et al. 2014; Corson, Campbell, and MacDonald 2014).

environmental foreign aid to Madagascar in order to expand protected areas, while nonetheless failing to combat the social drivers of environmental degradation.[12]

Environmental NGOs

Environmental NGOs occupy a critical position in global environmental governance networks. From the 1980s onwards, a small group of environmental NGOs expanded and internationalized to become transnational organizations. These transnational environmental NGOs (TENGOs), which include The Nature Conservancy, WWF, Conservation International, and Greenpeace, among others, have come to exercise substantial power over the nature and direction of environmental policy from international negotiations to local projects. These groups generally have thousands of employees worldwide, hundreds of millions of dollars in annual revenue, and activities in dozens of countries across the Global North and Global South.

In an early volume on international environmental NGOs, Princen and Finger (1994) argue that TENGOs are particularly effective and influential in their ability to make 'translational linkages,' one dimension of which involves connecting the local and the global in ways that transcend state structures and create new conditions to which states must react. A second dimension of TENGOs' translational linkages "connects the biophysical to the political" (Princen, Finger, and Manno 1994, 220–21). Environmental challenges transcend the territorial domain and political-economic optic of the state, and so NGOs work to create the terms of engagement between government and ecology through a focus on specific processes, actors, and framings. As actors that connect the local with the global, and the biophysical with the political, TENGOs are ideal subjects for researchers studying socio-ecological systems from a global perspective, with the

[12] Also worth highlighting is Steve Rhee's (2006) unpublished dissertation comprising an ethnography of the Center for International Forestry Research (CIFOR) and international-aid related forestry institutions in Indonesia.

potential to offer insights beyond those available through the study of supranational or parastatal bureaucracies such as The World Bank and USAID.

In a 1997 review essay on the 'associational revolution' of mushrooming NGO activity, William Fisher lamented, "There are relatively few detailed studies of what is happening in particular places or within specific organizations, few analyses of the impact of NGO practices on relations of power among individuals, communities, and the state, and little attention to the discourse within which NGOs are presented as the solution to problems" (Fisher 1997, 441). The intervening years have seen a growing literature on the role of NGOs in international politics (e.g., Keck and Sikkink 1998; Heins 2008; Murdie 2014), as well as a number of studies of NGOs working on environmental issues (Chartier and Deléage 1998; Chapin 2004; Bryant 2005; West 2006; Rootes 2006; Li 2007b; Bryant 2009; Holmes 2010; Macekura 2016). Research has included ethnographic work on NGOs, including some organizational ethnographies (e.g., Markowitz 2001; Hilhorst 2003; Igoe and Kelsall 2005; E. Mertz and Timmer 2010 special issue), yet there is a lack of focused attention on the major international environmental NGOs as a distinct category of actor in global environmental politics. Organizational ethnography can play a key role in addressing this gap and illuminating the motivations, perceptions, ideologies, and practices of TENGOs.

To date there has been virtually no ethnographic research inside the transnational environmental NGOs. The two important exceptions are the (mostly unpublished) studies of Sally Jeanrenaud (1998) and Sarah Milne (2009). Jeanrenaud drew on her experience as a consultant for WWF and IUCN to produce a critical study of WWF's shift to 'people-oriented conservation.' While not explicitly an organizational ethnography, Jeanrenaud's work is directly concerned with WWF's policy narratives, values, and organizational structures. Her dissertation, completed in 1998, included "a review of 35 years of field and policy documents, an analysis of over 2000

conservation projects undertaken since 1961, an evaluation of 150 contemporary forest conservation projects, seven field case studies and a wide range of interviews" (Jeanrenaud 2002, viii), and concluded that the shift to people-oriented conservation had not constituted a meaningful paradigm change in WWF policy and practice. Her findings have been published only in a highly abridged form (Jeanrenaud 2002).

Sarah Milne followed three years as a Community Program Manager with Conservation International (CI) in Cambodia with eleven months of ethnographic fieldwork on a CI direct payments project for biodiversity conservation in Cambodia's Cardamom Mountains. Her experience as a CI staff member gave her extraordinary access, and she was able to observe "the project's inception and design at the global level; its processes of implementation across scales and through national institutions; and its social effects at the local level" (Milne 2009, 83). Milne's thesis provides a global ethnography of the development of payments-for-ecosystem services in transnational conservation practice and illuminates the encounter of the policy narratives and organizational structures of CI with the 'local realities' of Cambodian communities. At the local level, she concludes that the socio-economic impacts of the project are inequitable and complex, and community engagement in the project was mostly instrumental, obscuring social justice concerns in favor of the demands of payment contracts. At the international level, she finds that TENGOs may have difficulty controlling project outcomes due to disconnects between theoretical policy models and practical political and cultural constraints and differences. Most of Milne's ethnographic work has yet to be published, though she is currently preparing a monograph based on her dissertation (Sarah Milne, pers. comm. 2015).

Jeanrenaud and Milne's research demonstrates the importance and potential of organizational ethnographic perspectives that illuminate the inner workings of transnational

environmental NGOs. At the same time, these examples highlight the dearth of published literature in this field and some of the particular challenges of this kind of research.

My research on tropical forest governance adopts a dialectical systems approach that draws heavily on political ecology and geographical political economy, using methods of both incorporated comparison and global ethnography of a transnational environmental NGO. The following sections detail the methodology of this study.

Methodology of this Study

As I began to develop my research on deforestation and forest governance in Brazil and Indonesia in the early 2010s, I sought a research design that could both distill the complex socio-ecological transformations happening at the forest frontier and illuminate the interconnections between distant places. I intended to carry out municipal-level case studies to capture varying subnational deforestation dynamics, and I was aware that as a component of its forest conservation programs in Brazil and Indonesia, The Nature Conservancy was running two flagship municipal-level REDD projects: one in São Félix do Xingu (São Félix) in the Brazilian State of Pará, where TNC started work in 2009, and one in the District of Berau in East Kalimantan, where they helped launch the Berau Forest Carbon Program, also in 2009. During a preparatory visit to Pará in 2012, I met with one of the managers of TNC's Amazon Conservation Program, which gave me a valuable first contact with the organization and background information on TNC's activities in the region. My initial attempts at comparative case selection based on variables such as municipal deforestation rates and agricultural production resulted in sets of cases that felt decontextualized and disarticulated. This variable-based case selection lacked a logic capable of connecting municipal cases to each other and to regional and global processes. In 2013, I decided to focus my research design on The Nature Conservancy. As a key actor in forest governance processes in both

the Brazilian Amazon and Indonesian Borneo, TNC offered a way of tying together and understanding diverse landscapes and global forest governance processes through the experience of a common actor.

I developed a combined methodology of organizational ethnography and incorporated comparison. I allowed the structure of TNC's forest conservation programs in Brazil and Indonesia to guide my comparative case selection. Since TNC forest activities were organized under two eco-regional programs in the Brazilian Amazon and one forest program in Indonesia, I chose municipality case studies to reflect the experiences of each of these programs, and I used my ethnographic research with each program to guide the selection of municipality cases. Organizational ethnography thus defined the contours of my comparison and helped to 'incorporate' my municipal case studies in the broader historical processes operating in the evolution of TNC's tropical forest programs. At the same time, the municipal case studies contributed to my organizational ethnography, since they included interviews and participant observation with local actors who would share with me the stories of their interactions with and perceptions of TNC.

Incorporated Comparison

This project asks why, despite similar histories and drivers of land use change, Brazil and Indonesia have since 2004 experienced divergent rates of deforestation. This question is rooted in a 'most similar systems' comparison (Przeworski and Teune 1970), and the goal of the comparison is to better understand the relationship between governance and tropical land use change. Deforestation and forest governance in Brazil and Indonesia have not emerged independently of each other, however. They are interconnected through global commodity chains, global

governance processes, and the global climate system. The proper comparative approach is therefore one of incorporated comparison.

I utilize a nested comparative case study design not dissimilar to CIFOR's Multilevel Governance case study design. My goal is to explore the contrasting experiences of forest governance between Brazil and Indonesia, as well as to understand the diversity of forest governance dynamics within each country. Reflecting the interconnected character of forest governance and land use change between the two countries, I selected my cases to follow the diverse experiences of a common actor. This actor was The Nature Conservancy, which is active in forest conservation efforts at multiple levels from villages on the forest frontiers of Borneo and the Amazon to international environmental negotiations.

In Indonesia, TNC's forest conservation work is focused principally on East Kalimantan Province in eastern Borneo. In Brazil, TNC activities in the Amazon were carried out by two distinct eco-regional programs, the Amazon Conservation Program, which was most active in Pará State, and the Atlantic Forest and Central Savannas Program, which had primary responsibility for activities in Mato Grosso State. Across these three programs, TNC activities were frequently targeted to the secondary jurisdictional level, which comprises *municípios* (municipalities) in Brazil and *kabupaten* (districts) in Indonesia. I refer to these jurisdictions as being at the municipal level and discuss them collectively as 'municipalities.' I used interviews with TNC staff at the level of each eco-regional program to determine the municipality where they felt their activities had been most successful and the municipality where they felt they had experienced their greatest difficulties.[13] I selected these municipalities as contrasting, paired cases (Tarrow 2010), arriving

[13] In East Kalimantan, only two districts have received significant on-the-ground conservation projects from TNC, so these two districts were selected by default as paired case studies.

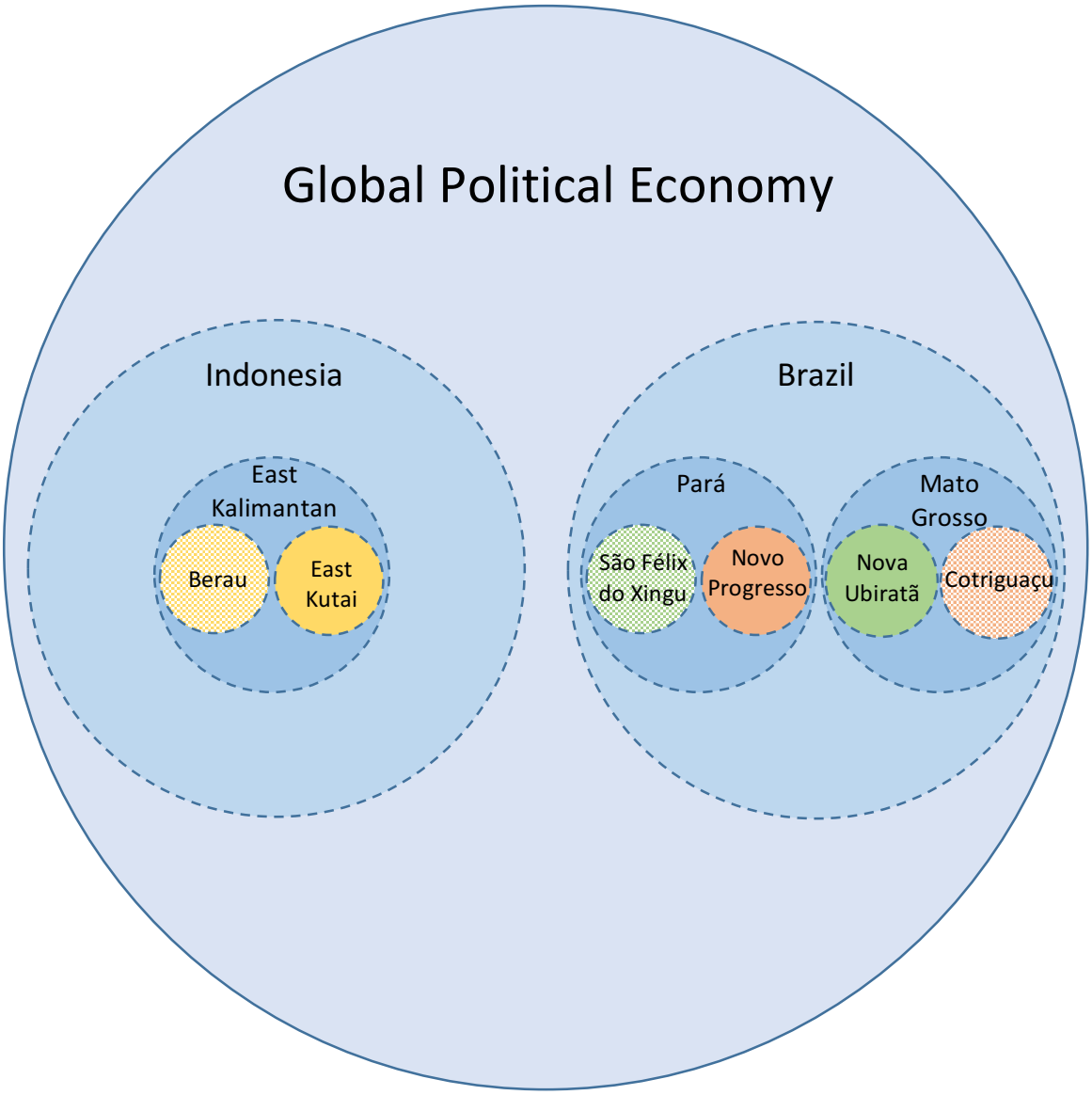
at a nested design of six municipal case studies in three different states or provinces across two different countries, which comprised a diverse case selection (Gerring 2008) capturing a wide range of variation in TNC's forest conservation activities and experiences.

Table 2.2: Forest cover and loss in study areas.

	Land Area (km^2)	Forest Cover in 2000 (km^2)	Forest Loss, 2001-2015 (km^2)	Forest Loss / Forest Cover (%)
INDONESIA[a]	***1,904,569***	***1,609,749***	***206,626***	***12.8***
East Kalimantan[b]	**204,534**	**186,215**	**24,889**	**13.4**
Berau	21,952	21,743	3,765	17.3
East Kutai	35,747	30,613	7,423	24.2
BRAZILIAN AMAZON[c]	***5,068,048***	***3,426,656***	***193,409***	***5.6***
Mato Grosso	**903,198**	**371,199**	**62,840**	**16.9**
Nova Ubiratã	12,707	7,455	1,942	26.0
Cotriguaçu	9,421	8,679	1,518	17.5
Pará	**1,247,955**	**946,240**	**70,639**	**7.5**
São Félix do Xingu	84,213	72,482	10,848	15.0
Novo Progresso	38,162	32,850	4,103	12.5

[a] Forest cover and forest loss figures in Indonesia at >30 percent canopy density are from Global Forest Watch (Hansen et al. 2013). [b] North Kalimantan province was excised from East Kalimantan province in 2012. Figures refer to the pre-2012 provincial area, i.e., present East and North Kalimantan provinces. [c] Brazilian Amazon area, forest cover, and deforestation figures are derived from INPE's PRODES program (INPE 2017) and refer to primary forest. Mato Grosso and Nova Ubiratã figures do not include Cerrado vegetation. State and municipal areas are the official figures reported by IBGE (2017a).

Figure 2.6: Nested case selection for incorporated comparison of tropical forest governance. Circles represent the global, national, state or provincial, and municipal levels. Borders at each level below the global are porous. In Brazil, the most successful municipality for each TNC eco-regional program is colored green, the most challenging municipality is colored orange. Municipalities hosting jurisdictional-level REDD projects are denoted by a textured background pattern.


Global Political Economy
Indonesia
East Kalimantan
Berau
East Kutai
Brazil
Pará
São Félix do Xingu
Novo Progresso
Mato Grosso
Nova Ubiratã
Cotriguaçu

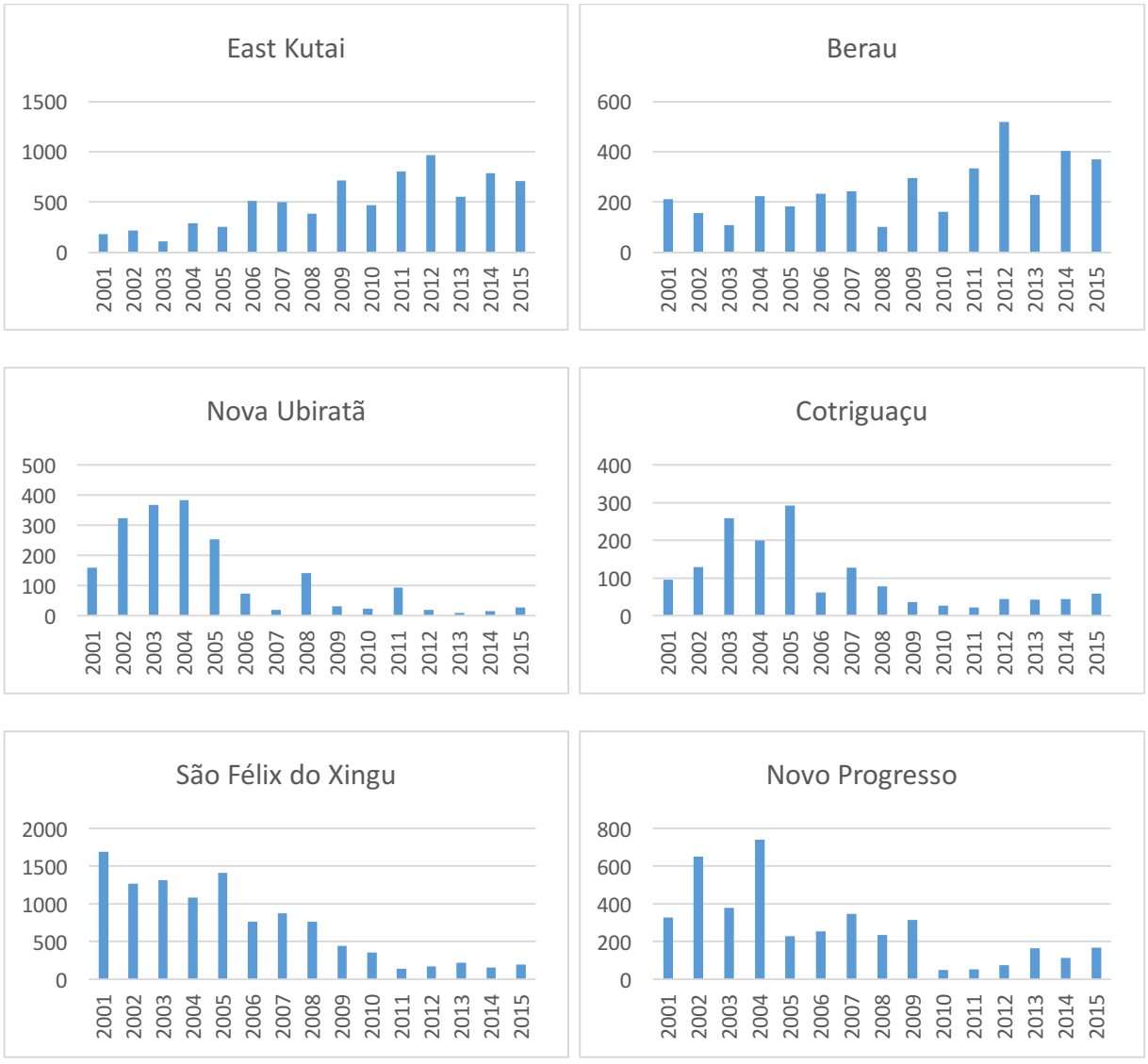


Figure 2.7: Annual forest loss in square kilometers in case study municipalities, 2001-2015. Forest loss figures for East Kutai and Berau are calculated by Global Forest Watch at >30 percent canopy density (Hansen et al. 2013). Forest loss figures for Nova Ubiratã, Cotriguaçu, São Félix, and Novo Progresso are primary Amazon deforestation reported by INPE's PRODES program (INPE 2017).

As an incorporated comparison, the goal of these nested case studies was to "give substance to a historical process" (McMichael 1990, 386) of forest governance and land use change through a comparison of its parts. Structuring case selection around the activities of The Nature Conservancy served to make explicit the interconnections between distant places. An incorporated

comparative approach affects not just case selection, but also the questions that are investigated and the analysis that occurs. I sought to understand the mutual constitution of municipal deforestation dynamics with global forest governance processes. In my interviews, I would ask informants about their vertical connections with actors and processes at other levels, as well as their horizontal connections to other places. These comparative case studies were carried out in combination with organizational ethnography.

Organizational Ethnography

Through my organizational ethnography of TNC's tropical forest conservation programs, I sought to "think culturally" (Bate 1997, 1153) about the development of tropical forest governance through the individual ideas, experiences, and relations of TNC staff as members of a transnational organizational network, and through the socially-constructed discourses, structures, and practices of the organization. What are the motivations of TNC staff members? How do they understand problems? How do they make decisions and choose conservation strategies? And how do they evaluate success and failure? Taking TNC as an example of a transnational environmental NGO, I was particularly interested in how TNC links the local with the global in the production of tropical forest governance, and how TNC sees itself, especially in relation to other actors such as governments, local people, corporations, and other NGOs. My ethnography of TNC's tropical forest programs thus looked both outward, for an understanding of the production of tropical forest governance, and inward, for an understanding of the culture of TNC as a transnational environmental NGO. This dissertation focuses on the production of tropical forest governance, while my research on the internal culture of TNC is the focus of a companion project and plays a more peripheral role in this manuscript.

There are particular benefits to be gained from conducting transnational research within a transnational organization. A common strategy for global ethnography is to trace the linkages between a 'local' site and the 'global' level. Examples of this strategy include Corson's (2016) work linking environmental governance in Madagascar with the US Congress and USAID headquarters in Washington, DC, and Milne's (2009) study linking conservation interventions in Cambodia with decision-making at Conservation International headquarters in the United States. This approach is analogous to a 'chain of explanation' that links the local with the global in a two-dimensional portrait of 'international' phenomena. While valuable insights are gained from this approach, a more 'global' picture is possible if the researcher 'takes transnationality seriously' and follows "webs of relation" (Rocheleau 2008) across multiple local and global sites in order to produce three-dimensional portraits of transnationality (Figure 2.8). Here a focus on a transnational organization lends a structure to help define the transnational 'field.' By studying TNC's tropical forest programs in both Brazil and Indonesia, and conducting interviews and participant observation at multiple levels from frontier villages to international environmental negotiations, I was able to develop a three-dimensional understanding of TNC as a transnational organization and forest governance as a transnational phenomenon, beyond the subnational and cross-national dimensions of my comparative case studies.

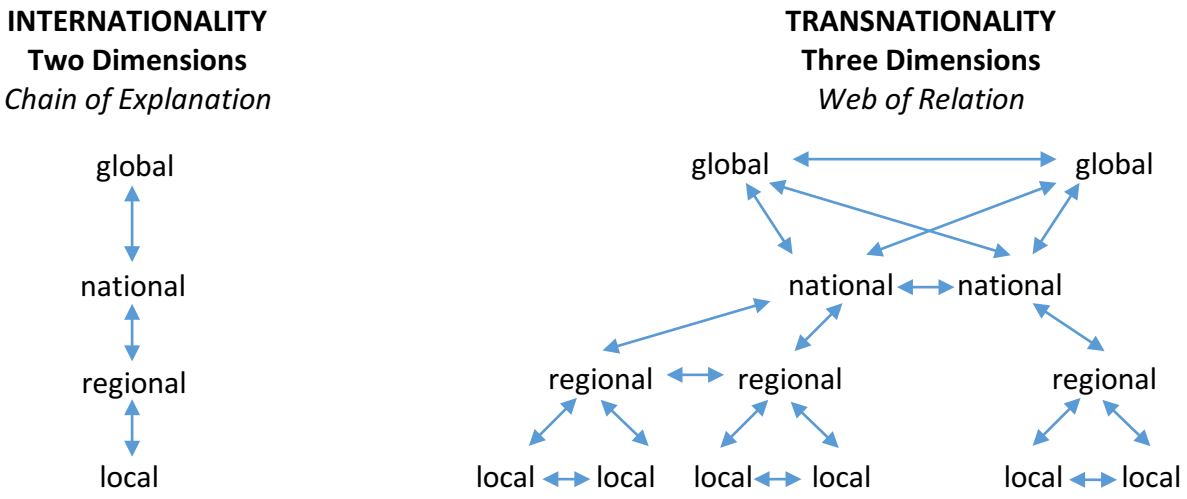


Figure 2.8: Global Research Design. Graphic representation of an international, two-dimensional chain of explanation versus a transnational, three-dimensional web of relation. Arrows indicate only the most direct vertical and horizontal relations.

Methods and Data

I conducted over two years of fieldwork in 2013-2015. My research in Brazil took place from September 2013 to August 2014. My Indonesia fieldwork ran from November 2014 to July 2015. In Brazil, I was affiliated with the Center for Sustainable Development (CDS) at the University of Brasília. In Indonesia, I was affiliated with the Center for International Forestry Research (CIFOR), an international research center within the CGIAR network, which is headquartered in Bogor, Indonesia. I speak fluent Portuguese and advanced Bahasa Indonesia, and I conducted interviews and collected materials in both languages, as well as in English. All translations used in the dissertation are my own.

For the organizational ethnography, I conducted participant observation with the three TNC eco-regional programs in Mato Grosso and Pará States in Brazil and East Kalimantan Province in Indonesia. I spent time in TNC regional offices in the state and provincial capitals, as well as in municipal offices while I carried out my municipal case studies. In locations where TNC

had physical offices, I was given desk space from which I could work and observe office activity. I traveled with TNC staff to project sites, accompanied them to meetings and events, and conducted interviews at every level from field staff to regional program directors to staff in the national headquarters in Brasília and Jakarta.

In July and August 2015, I interviewed members of TNC's executive team and World Office staff, including during a week of meetings in August at TNC's Arlington, Virginia headquarters. I also observed TNC's participation in major international events, including a November 2014 "Learning Exchange" in Jakarta that brought together TNC staff from the World Office with staff from Brazil, Indonesia, Mexico, Papua New Guinea, and Belize, and the December 2015 Paris Climate Conference, which was attended by staff from the World Office, Brazil, Indonesia, and Mexico, among others. I shared meals with TNC staff, sang karaoke with TNC staff, and slept on floors in remote villages with TNC staff. I also interviewed numerous former TNC staff members who participated in earlier stages of the organization's forest conservation efforts. Overall, I conducted in-depth interviews with 58 current and former TNC staff members. I also collected documentary materials ranging from TNC publications and promotional materials to project evaluations to internal memos to memoirs of former TNC staffers. The key divisions of TNC that I engaged with in my research are represented in the organogram in Figure 2.9.

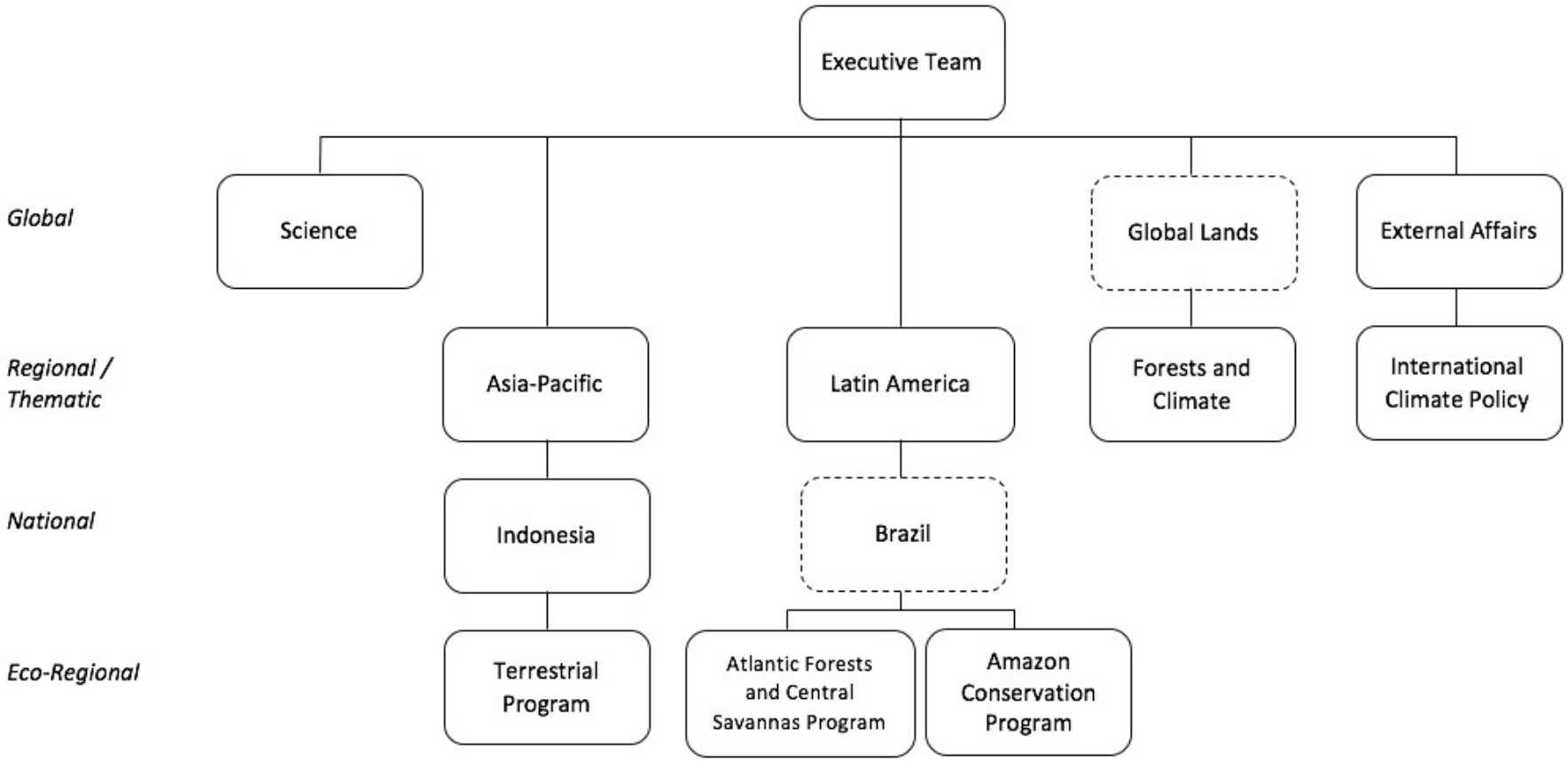


Figure 2.9: Simplified TNC organogram showing most relevant components for my organizational ethnography. Only direct relationships are shown. Organizational structures shifted during research. Some key components that were consolidated after the start of research are denoted by dashed boxes, while some original components were later reabsorbed.

In addition to my research into TNC's tropical forest programs, my research for the nested case studies involved interviews with government, private sector, and civil society actors; participant observation of local, regional, and national forest governance activities and events; and the analysis of documentary materials and socio-environmental survey data at the municipal, state or provincial, and national levels. Beyond my interviews with TNC staff, I conducted 123 semi-structured interviews with government officials; international and domestic NGO staff; and representatives of industry, farmer, and community associations. I also collected news stories, policy documents, and scientific studies related to my field sites.

While my research in Brazil was conducted independently, my work in Indonesia took place under the auspices of CIFOR's Global Comparative Study on REDD+, within the module devoted to research on subnational REDD+ initiatives. As part of this study, CIFOR researchers have collected longitudinal data at the household, village, and project levels of over 20 REDD initiatives in six different countries (Sunderlin et al. 2016). The study uses a 'before-after/control-intervention' (BACI) design to collect identical data both before and after the implementation of project interventions and in both intervention sites (those within the project boundary) and control sites (locations similar to the intervention site but not impacted by the REDD intervention). The study aims to assess changes in human welfare, deforestation, and other relevant outcomes of REDD interventions, as well as evaluating the processes through which REDD projects are implemented. The household survey component includes at least 120 households in each project site, surveyed at roughly four year intervals beginning around 2010. Berau and Kutai Timur in Indonesia are included in the study as intervention and control sites, respectively, and São Félix and Cotriguaçu in Brazil are included in the study as intervention sites. Through my affiliation with CIFOR, I received access to the data from these four sites. In this dissertation, I draw on these

data exclusively for the case study analysis of Berau, but I intend to utilize them more fully in future work. In Chapter 3, I proceed with a discussion of my theoretical framework.

CHAPTER 3

LAND SPARING, MODERNIZATION, AND THE GLOBAL POLITICAL ECONOMY

This chapter begins with a discussion of the 'land sparing hypothesis' and its linkages with other socio-environmental modernization theories. I relate these modernization perspectives to the rise of 'new conservation science' and eco-modernism in environmentalist discourse. I then develop a theoretical framework for analyzing forest governance and land use change from a systemic perspective, drawing primarily on ecological Marxist political economy and development sociology. I discuss the relationship between extraction and production in the global capitalist economy and I advance the concept of extractive and productivist political-economic regimes. Lastly, I propose a sociological hierarchy of regimes, complexes, and coalitions as a tool for analyzing political-economic transformations, in this case, changes in forest governance and land use.

We Have Always Been Modernizing

The land sparing hypothesis permeates scientific debates in conservation biology, land change science, and the many cognate fields where academics struggle with the wicked problems of 'feeding the world' and 'saving the planet.' Not confined to the academy, land sparing has been taken up by environmentalists and corporate executives, government officials and pundits, farmers and philanthropists. As an idea, it has a history; as a discourse, it has a politics. I begin, though, with a definition.

The land sparing hypothesis holds that:

a) agricultural intensification increases production per unit of land, such that
b) a given demand can be met by cultivating a smaller area; therefore,
c) land that would otherwise have been used for agriculture is spared for other uses.

Agricultural expansion is the largest driver of anthropogenic land cover change (Ramankutty and Foley 1999; M. Williams 2006), and most agricultural expansion in the tropics has come at the expense of forests (Gibbs et al. 2010). Advocates therefore argue that agricultural intensification can spare land for 'nature,' and in the tropics, land sparing can avoid the conversion of standing forests or free up land for reforestation.

The land sparing hypothesis has deep roots in the environment and development debates of the mid-20th century. In the pre-World War II period in the US, some New Deal programs such as the Soil Conservation Service and the Tennessee Valley Authority had encouraged farmers to retire poor soil and seek increased yields in smaller acreages in the interest of local environmental benefits (Timothy Johnson, pers.comm.). Following WWII, however, industrial agriculture both intensified and expanded, driven by advances in fertilizer production, mechanization, plant breeding, and the development of agri-food supply chains geared towards meat and processed food production (Friedmann and McMichael 1989). Capital-intensive, high-productivity agriculture was part of a modernist vision of development, linked to ideals of urbanization, industrialization, high technology, and control of nature (Scott 1998), as well as to the geopolitics of the Cold War period. Modernization theory flourished in the 1950s and 1960s as an ideology of linear, teleological social evolution towards industrial consumer capitalism, epitomized by Rostow's (1960) 'stages of growth.' The Green Revolution, which transformed agriculture in the Global South in the 1960s and 1970s, globalized agribusiness capital and the high-input, high-intensity mode of industrial agricultural production as the foundation for 'modernization' and 'development' of the Third World.

By the 1960s, however, the environmental consequences of global growth were also becoming increasingly apparent. The publication of Rachel Carson's *Silent Spring* in 1962 decried

the deleterious environmental impacts of pesticide use in industrial agriculture and was a clarion call for the nascent Northern environmental movement. The UN Conference on the Human Environment, held in Stockholm in 1972, highlighted divisions between North and South over environmental issues, where concern for the environment was seen by developing countries as a luxury of the rich. In the shadow of the Club of Rome's *Limits to Growth* report, released that same year, the prevailing view was that pursuit of economic development and environmental protection posed irreconcilable tradeoffs.

During the 1970s, environmentalists began to question the tradeoffs perspective, and increasingly it was understood that environmental protection required attention to human wellbeing, while development would be undermined by environmental degradation. This perspective was reinforced over the course of the 1980s by increasing contacts between Northern and Southern environmental activists. With the 1980 publication of the *World Conservation Strategy* by IUCN, UNEP, and WWF, and subsequently with the release of the famous Brundtland Report in 1987, 'sustainable development' emerged as a new paradigm seeking synergies between environmental protection and economic development (Hajer 1995; Keck and Sikkink 1998; Lee, Ferraro, and Barrett 2001).

As synergistic thinking came to predominate, the idea that agricultural intensification might bring global environmental benefits began to take shape. In a Malthusian vein, the recognition of planetary limits meant that agricultural intensification was necessary to feed a growing population, in an extension of the Boserupian argument that agricultural intensification was driven by land scarcity under population pressure (Boserup 1965). In a more optimistic vein, increasing agricultural productivity was not just the foundation of socio-economic modernization, but also a critical component of *ecological* modernization. If environmental concern and

improving environmental quality was a luxury of developed countries, then as all countries modernized to achieve high levels of development, environmental quality could improve across the board.

The environmental benefits of agricultural intensification were imagined in several ways. Most generally, increasing agricultural productivity was associated with increasing incomes, which should then be associated with improving environmental quality (Lee, Ferraro, and Barrett 2001). This logic follows the environmental Kuznets curve (EKC) hypothesis, which posits an inverted U-shaped relationship between environmental degradation and GDP per capita, where degradation accelerates in the early stages of economic development, and then decreases after a certain level of development is surpassed. More specifically, it was argued that agricultural intensification delivered environmental benefits through land sparing. Land sparing arguments for agricultural intensification were made by Norman Borlaug, Nobel laureate and 'father' of the Green Revolution, already in the 1980s (Waggoner 1995; Borlaug 2002), and the 1990s saw a proliferation of calculations, models, and policy papers advocating land sparing intensification as a 'win-win' for environment and development (Sanchez, Palm, and Smyth 1990; Serrão and Toledo 1990; Goklany and Sprague 1992; Waggoner 1995; Barbier and Burgess 1997; Goklany 1999; Lee, Ferraro, and Barrett 2001). Land sparing arguments were linked as well to the development of forest transition theory, which began to emerge in the early 1990s on the basis of the observation that in some parts of the industrialized world historical declines in forest cover had been reversed and forests were recovering. The forests of New England often served as a paradigmatic example, and forest transition theory held that over time, and under the pressure of labor shortages caused by migration to urban centers, farmers shifted to more intensified

production on the most fertile available lands, allowing less suitable land to return to forest (Mather 1992; MacCleery 1993; Grainger 1995; Mather and Needle 1998).

Land sparing made agricultural modernization environmentally-friendly, and it made environmental conservation development-friendly. Conservationists began to embrace agricultural intensification as an environmental strategy in the 1980s and 1990s. Intensification to alleviate local deforestation pressures figured in numerous integrated conservation and development projects (ICDPs) that dominated the conservation landscape during this period (Lee, Ferraro, and Barrett 2001), and CGIAR's 'Alternatives to Slash-and-Burn' (ASB) global research program was founded in 1994 to promote more intensive agricultural practices in tropical forest margins. Criticisms of the environmental impacts of industrial agriculture and the Green Revolution were also common during this period (Kloppenburg 2004; Friedmann 1993; Altieri 1995; Pingali, Hossain, and Gerpacio 1997), and empirical evaluations of the land sparing hypothesis returned decidedly mixed findings. Numerous studies pointed to the operation of rebound effects or the 'Jevons paradox,' where increased productivity might lead to lower commodity prices and increased demand, driving rising land values and profitability and resulting in additional agricultural expansion (Kaimowitz and Angelsen 1998; Lee, Ferraro, and Barrett 2001).

Mixed evidence did little to dampen enthusiasm for the land sparing hypothesis, however. The same can be said of EKCs and forest transition theory, which developed alongside the land sparing hypothesis and ecological modernization theory during the 1990s as a web of "modernization-based environmental social theories" (Perz 2007). Classical modernization theory was largely abandoned in the social sciences after the 1960s, beset by a variety of critical perspectives including dependency theory, world systems analysis, and poststructuralism, though linear, evolutionary perspectives on capitalist development certainly did not disappear from the

popular imagination. Moreover, despite the supposed death of modernization theory four decades ago, socio-environmental modernization theories have been a constant presence in academic and policy debates since the 1980s, justifying the conciliation of environment and development under ecological modernization discourse (Hajer 1995).

Academic attention to the land sparing hypothesis burgeoned in the mid-2000s. A group of conservation biologists at Cambridge University attempted to formally model and empirically assess the environmental and economic tradeoffs between land sparing (high-intensity, low-biodiversity) agriculture and land sharing (low-intensity, high-biodiversity) agriculture, concluding tentatively in favor of land sparing as a preferred approach for conservation and development (Green et al. 2005; Balmford, Green, and Scharlemann 2005). The ensuing land sparing versus land sharing debate has generated dozens of scientific studies over the course of the past decade (Grau, Gasparri, and Aide 2008; Edwards et al. 2010; Perfecto and Vandermeer 2010; Fischer, Batáry, and Bawa 2011; Phalan, Balmford, et al. 2011; Phalan, Onial, et al. 2011; Tscharntke et al. 2012; Fischer et al. 2014; Edwards et al. 2015; Griscom and Goodman 2015; for a review see Kremen 2015). This debate has also prompted a more rigorous examination of the land sparing hypothesis itself. In smallholder systems where local markets dominate, some studies have found that agricultural intensification may lead to land sparing and even forest regrowth (Locatelli, Boissau, and Weber 2004; Shively and Pagiola 2004). At the global level, Stevenson et al. (2013) estimate that yield gains from germplasm improvement in staple crops spared 18 to 27 million ha from being brought into agricultural production in 1965-2004, an effect "orders of magnitude lower" than predicted by simplistic calculations such as Borlaug's (Stevenson et al. 2013, 8365). They also caution that intensification at the forest margin for the production of goods with elastic global demand is likely to increase pressure on forests and in the absence of strong

conservation policies may lead to increasing deforestation. Indeed, Rudel et al. (2009) find that in 1970-2005, rising yields have rarely been accompanied by declines in cultivated areas either nationally or globally, and national-level land sparing effects have often been accompanied by displacement through increasing grain imports. In many cases, as staple yields increase and cropland devoted to staples declines, non-staple crop production expands, canceling out the land sparing effect of intensification (Ewers et al. 2009).

In the Brazilian Amazon, two forms of agricultural intensification predominate. One is intensification of cattle ranching through practices such as improved pasture management (non-innovative intensification), while the other is intensification via a transition in techno-managerial system from ranching to industrial field agriculture (innovative intensification) (cf. Laney 2002). Other forms of intensification exist also, for instance through diversification of smallholder production with cacao agroforestry, which has been promoted by TNC in São Félix do Xingu. Ranching intensification and pasture-to-cropland conversions are the most important forms of agricultural intensification for the Amazonian land use transition, however. Barretto et al. (2013) show that before 2006, ranching intensification and crop yield increases in frontier areas coincided with agricultural expansion in the Brazilian Amazon, contradicting the land sparing hypothesis. They also find that in southern and southeastern Brazil, crop and pasture intensification under conditions of land scarcity did result in land sparing. Land scarcity, or territorial constriction that produces land scarcity, thus appears as a key variable interacting with agricultural intensification to determine land cover change, and many land sparing advocates acknowledge the importance of complementary environmental policies for achieving conservation benefits from land sparing (Phalan, Balmford, et al. 2011; Balmford, Green, and Phalan 2012).

In Indonesia, meanwhile, agro-industrial intensification at the forest margin involves increasing yields in oil palm production through improved crop varieties and fertilizer application, as well as land use intensification that seeks to direct plantation expansion toward 'degraded lands' (R. Stone 2007; Daemeter Consulting 2013; Sigit 2015). In smallholder systems, governance efforts have also sought to reduce clearing for swidden agriculture by promoting production of permanent tree crops such as rubber and cacao, and in forestry, TNC scientists have discussed the tradeoffs between natural forest logging and tree plantations in a 'sharing versus sparing' framework, though they have rejected the facile translation of agricultural intensification debates to the forestry sector (Griscom and Goodman 2015). For oil palm, which is the primary agricultural land use driving forest conversion in Indonesia (Abood et al. 2015; Griscom et al. 2016), yield gains over the past two decades have been minor and over 90 percent of Indonesian production growth has come from land expansion (Villoria et al. 2013). Villoria et al. (2013) have modeled the potential land sparing impacts of oil palm intensification, and argue that yield growth in Indonesia and Malaysia might slightly increase regional deforestation, but with land sparing effects at the global level.

In both Brazil and Indonesia, questions of governance and scale are critical to assessing the environmental impacts of agricultural intensification. Where intensification does spare land from agricultural production, it will only spare land *for* nature if governance effectively restricts conversion of natural habitats (Phalan, Balmford, et al. 2011; Balmford, Green, and Phalan 2012; Ceddia et al. 2014). With strong environmental governance and agricultural intensification, it may be possible to 'decouple' agricultural production from deforestation at local or regional scales. Scale is critical, however, as land sparing in one region may be canceled out by 'leakage' of land cover change beyond regional boundaries, or displacement of land conversion to other parts of the

globe (Meyfroidt and Lambin 2009; Oliveira and Hecht 2016). In Brazil, for instance, Walker (2012) argues that land scarcity and productivist development leading to land sparing in the southern and southeastern Atlantic Forest region simultaneously drove increased deforestation in the Amazon.

These scalar problems are not unique to land sparing; rather, they are a common weakness of modernization theories. With regard to deforestation, cross-country EKC and forest transition studies may misread the geography of land cover change, falling into the 'territorial trap' (Agnew 1994), while telecouplings producing indirect land use change and displacement (Meyfroidt and Lambin 2009; Meyfroidt, Rudel, and Lambin 2010; Liu et al. 2013; Liu 2014; Arima et al. 2011; Richards 2015) render analyses below the global level susceptible to what Berlik et al. call "the illusion of preservation" (2002, 1557). For this same reason, one of the major critical tendencies undermining modernization theory after the 1960s came from systemic perspectives such as dependency and world systems analyses.

New Conservation Science, Eco-Pragmatism, and Eco-Modernism

Alongside these seemingly circular debates around modernization-based socio-environmental theories (Perz 2007), ecological modernization discourse has come to occupy an ever more hegemonic position in global environmental and development policy (Hajer 1995). While the development apparatus has to some degree adapted to or absorbed environmental concerns (Goldman 2005), my focus here is on shifts in environmentalist discourse and practice that have led to the centering of land sparing as a forest conservation strategy.

'Big conservation,' as practiced by the major international environmental NGOs, has undergone a dramatic transformation since the 1990s from a 'biocentric' focus on protected areas and species conservation to an 'anthropocentric' focus on ecosystem services and sustainable

production or ‘green growth’ (Chapin 2004; Kareiva, Marvier, and Lalasz 2012; Hunter, Redford, and Lindenmayer 2014; Doak et al. 2014). There are at least three primary drivers propelling this transformation. First, since the environment and development debates of the 1970s, conservation organizations have come under sustained critique for ‘fortress conservation’ (Brockington 2002) that focuses on environmental protection to the exclusion of local peoples’ interests and livelihoods (Wilshusen et al. 2002; Chapin 2004; Dove 2006), and for related Edenic, romanticized ideals of pristine and uninhabited ‘wilderness’ (Denevan 1992; Cronon 1996; Kareiva, Marvier, and Lalasz 2012). These critiques have prompted innovations such as integrated conservation and development projects (ICDPs) and the sustainable development concept, and constitute one justification for contemporary anthropocentric arguments that orient environmental protection to human benefit (Kareiva, Marvier, and Lalasz 2012).

Second, the globalization of environmental crisis has at once produced a perception of humanity as both existentially threatened and also globally responsible under the emerging discourse of the ‘Anthropocene’ (Lowenthal 1990; Steffen, Crutzen, and McNeill 2007; Johnson et al. 2014). Global environmental crises including mass extinction, climate change, ocean acidification, and the hole in the ozone layer pose severe threats to human societies and are understood to demand globally-coordinated efforts across large spatial scales. These crises necessitate action far beyond protected area designation or preservation of endangered species; rather, they require responses that address the underlying socio-economic drivers of environmental degradation (Hance 2016). These drivers emerge from similarly globalized structures, including transnational corporations, global commodities markets, and international institutions. In the frame of the Anthropocene, conservation that is not anthropocentric is anachronistic.

Third, the rise of neoliberalism since the 1980s, with its strong focus on marketization and economic valuation, has included a plethora of new modalities of environmental management and the widespread restructuring of environmental governance (James McCarthy and Prudham 2004; Lemos and Agrawal 2006; Igoe and Brockington 2007; Castree 2010b; Castree 2010c; Castree 2010a; Castree 2011; Arsel and Büscher 2012; Castree and Henderson 2014). In particular, the development of the 'ecosystem services' perspective for apprehending and managing the environment has implied the abstraction of nature into a form capable of bearing social value that can be negotiated through market exchange (Robertson 2012), via modalities such as payments-for-ecosystem services (PES), biodiversity offsets, and emissions cap-and-trade systems. With the neoliberal impulse to create exchange values throughout human socio-ecological systems, in other words, man has become the measure of nature.

These three drivers – the critique of fortress conservation, the advent of the Anthropocene, and the rise of neoliberalism – have catalyzed the emergence of a perspective called 'new conservation science' (NCS) and the articulation of ideologies of 'eco-pragmatism' or 'eco-modernism.' Peter Kareiva, during his tenure as Chief Scientist of TNC, was a highly visible proponent of NCS and eco-pragmatist viewpoints, which reinforced TNC's already heavily market-oriented and pragmatic conservation approach (TNC 2016b). The NCS label has come into common use only since 2012 (Kareiva and Marvier 2012; Soulé 2013; Doak et al. 2014) to describe a generally anthropocentric approach to conservation aimed at "de-emphasizing the goal of protecting nature for its own sake in favor of protecting the environment for its benefits to humans" (Doak et al. 2014, 77). In Kareiva's view, the goal of conservation should not be the preservation of "islands of 'pristine nature' in a sea of profound human transformations," but rather "to enhance

those natural systems that benefit the widest number of people" through the design of sustainable "working landscapes" (Kareiva, Marvier, and Lalasz 2012).

NCS and Kareiva's eco-pragmatism are closely related both conceptually and institutionally (through the support of The Breakthrough Institute) to eco-modernism, which has received much attention after the 2015 publication by a group of scientists and science communicators of "An Ecomodernist Manifesto" (Asafu-Adjaye et al. 2015). Eco-modernism is an explicit iteration of ecological modernization discourse, permeated by narratives of anthropocentric sustainable development, ecosystem services, and the Anthropocene. In their manifesto, the eco-modernists write, "The modernization processes that have increasingly liberated humanity from nature are, of course, double-edged," (17) since they have generated "serious, long-term environmental threats to human well-being, such as anthropogenic climate change, stratospheric ozone depletion, and ocean acidification" (10). Nonetheless, they maintain that "knowledge and technology, applied with wisdom, might allow for a good, or even great, Anthropocene" (6). The eco-modernist prescription for a 'good Anthropocene' relies heavily on land sparing. The manifesto asserts:

> "Intensifying many human activities — particularly farming, energy extraction, forestry, and settlement — so that they use less land and interfere less with the natural world is the key to decoupling human development from environmental impacts. These socioeconomic and technological processes are central to economic modernization and environmental protection. Together they allow people to mitigate climate change, to spare nature, and to alleviate global poverty." (7)

The idea of land sparing intensification as the mechanism for reconciling environmental protection with economic development thus remains foundational to contemporary ecological modernization thinking and is heavily influential to the praxis of 'new conservation,' as exemplified by transnational environmental NGOs like TNC, WWF, and CI.

NCS, eco-pragmatism, and eco-modernism have been the objects of numerous critiques, in responses to Kareiva in the *Breakthrough Journal* (Robbins 2012; Suckling 2012; Hayward and Martinez 2012), responses to the eco-modernists including in a special section of *Environmental Humanities* (vol. 7, 2015), and elsewhere (Doak et al. 2014; Collard, Dempsey, and Sundberg 2015). Again, it seems as if the empirical weaknesses of modernization arguments have little effect on their popularity. As Doak et al. demonstrate, the prescriptions of NCS rest primarily on assumptions and values, not analysis and facts (2014, 80). NCS argues that conservation should be done for the sake of human well-being, and then equates well-being with business interests and economic prosperity (Doak et al. 2014, 79). In Chapter 4, I describe how land sparing became a central element of TNC's tropical forest conservation strategies, as land sparing ideas and programs evolved in articulation with the deepening of new conservation science at TNC.

My analysis of TNC's tropical forest programs and the broader trajectories of forest governance and land use change in Brazil and Indonesia develops a systemic critique of modernization perspectives. I explain why a land sparing agenda has largely been stymied in Indonesia, how land sparing has been effectively implemented in the Brazilian Amazon, and how Brazil's success provides a mostly illusory environmental benefit due to land use change displacement. My theoretical framework for analyzing comparative and transnational dynamics of tropical forest governance and land use change is grounded in ecological Marxist political economy and development sociology.

Extraction, Production, and Socio-Political Organization in the Capitalist World Ecology

Marxian analyses highlight the expansionary dynamics of capitalism. Competition and declining rates of profit in a capitalist system create a growth imperative that can be met through gains in productivity or through primitive accumulation, which Harvey (2004) terms

'accumulation by dispossession.' While productivity gains derive from improved production efficiencies, which may include technological innovations and capital investments, primitive accumulation describes the enclosures involved in the creation of new markets as well as the continuing appropriations of 'free gifts of nature' (in the terminology of the classical economists) or uncompensated labor (De Angelis 2001; De Angelis 2004; Glassman 2006; Araghi 2009). Marx famously observed that capitalist production rests on "simultaneously undermining the original sources of all wealth – the soil and the workers" (*Capital Vol. I* in Moore 2000, 127). In addition to the degradation of labor, the first great contradiction of capitalism, ecological Marxists have emphasized the degradation of the environment as a second fundamental contradiction of capitalism (O'Connor 1988; Foster 1992), rooted especially in the 'metabolic rift' of capitalist production between the countryside (periphery) and the city (core) (Foster 1999; Moore 2000).

In the classic formulation of the metabolic rift, crops grown in the countryside are consumed in the cities, leading to the concentration of nutrients in cities and the degradation of soil fertility in the country. The metabolic rift is a fractal feature of capitalism (cf. Appadurai 1996), operating at the local level between hinterlands and urban centers, at the regional level between agricultural and industrial zones, and at the global level between the natural resource-based economies of the Global South and the industrial economies of the Global North (Foster 1999). As a process of uneven development and environmental degradation, the metabolic rift is also a fundamental dynamic in the expansion and deepening of capitalist relations as waves of resource exhaustion drive new enclosures in expanding frontiers of primitive accumulation (Harvey 2001). Moore therefore argues that the metabolic rift is "a fundamental ecogeographical feature of capitalism as a world-system that contained a powerfully globalizing spatial logic" (2000, 136).

From the world system perspective, the expansionary dynamics of capital play out through the globalizing reproduction of center-periphery formations. As Foster and Holleman (2014) explain, the global metabolic rift of capitalism derives to a substantial degree from relations of unequal ecological exchange. The general phenomenon of unequal exchange in capitalist trade relations is rooted in the competitive equalization of rates of profit that allows wage differentials between 'developed' and 'underdeveloped' regions or countries (those with higher versus lower levels of fixed capital investment, or as Hornborg (2001) would have it, higher versus lower 'technomass') to exceed productivity differentials, such that the low-wage countries exchange more value for less. This economic mechanism combines with the monopolistic behavior of dominant core actors, which skews the terms of trade against underdeveloped countries, compounding unequal exchange relations and concentrating value in the core at the expense of the periphery. These inequalities of global trade relations were at the heart of dependency theories that emerged in the 1960s in opposition to modernization perspectives (Frank 1966; Frank 1967; Cardoso and Faletto 1979).

The ecological dimension of unequal exchange is based on the free appropriation of 'nature's gifts,' which are then inserted into unequal trade relations, resulting in the unequal exchange of embodied energy ('natural' or 'use' values), including embodied labor (Hornborg 1998; B. Clark and Foster 2009; Foster and Holleman 2014). A useful illustration of the effects of unequal ecological exchange comes from ecological footprint analysis, which demonstrates that a country's ecological footprint may be inversely related to its environmental degradation, as developed (industrialized) economies displace environmental loads to developing (natural resource-based) economies (Tucker 2000; Jorgenson 2006; Hornborg 2012).

The border zones of capitalist expansion, where processes of primitive accumulation appropriate ecological value and enclose new capitalist space, are frequently configured as 'frontiers' of natural resource extraction and land conversion (Moore 2010a; Barbier 2011; Peluso and Lund 2011; Barbier 2012). These frontiers typically extract and exhaust raw materials or soil fertility, producing 'boom and bust' development patterns (Rodrigues et al. 2009). In the broadest sense, capitalist development is a dialectic of primitive accumulation and productivity, and in the capitalist geography of unequal exchange and uneven development (N. Smith 1984), this dialectic is manifested through the coevolution of what Bunker (1985) terms extractive and productive economies.

Extraction and Production

Stephen G. Bunker's (1985) *Underdeveloping the Amazon: Extraction, Unequal Exchange, and the Failure of the Modern State* was a landmark study for thinking about unequal exchange based on an incisive analysis of the economic history of the Amazon. Bunker's theorization of Amazonian (under)development and capitalist dynamics is a foundation for my analysis of Brazilian and Indonesian land use change.

In what he describes as a synthesis of externally focused theories of imperialism, dependency, and world systems with internally focused theories of modernization and modes of production, Bunker shows how the energy-concentrating, increasingly complex structures of productive economies are dependent on the energy-dissipating, simplifying structures of extraction. For Bunker,

> "the complex social organizational, demographic, and infrastructural forms that emerge as technological change and accumulation accelerate the flow of energy through the articulated productive systems ultimately depend on processes that progressively decelerate the economy, disrupt the ecosystem, and simplify social organization in extractive regions." (1985, 30–31)

Bunker anchors his argument in the Brazilian Amazon, where he describes how successive export economies have extracted resources such as minerals, timber, or (in the case of cattle pasture) soil fertility, to support the productive economies of urban centers, southern Brazil, and the Global North.

I adopt Bunker's understanding of the relation between extractive and productive economies, and I seek to expand his theoretical apparatus with a particular attention to the political arrangements that help to stabilize and reproduce structures of extraction and production.[14] Bunker's analysis pays considerable attention to the state, which he describes as emerging in productive centers and seeking to impose control and regulation on extractive peripheries. The 'modern state' is a specific form of organization, an energy-concentrating and energy-directing bureaucratic structure of socio-economic control:

> "The modern state, however, emerged out of energy-intensive industrial production systems. In its promotion of social welfare, in its attempts to maintain order, and in its regulation of economic activities, the modern state's complexity and size have corresponded to the high degree of economic differentiation, specialization, and complexity of the articulated industrial economy. As it has grown, its increased size and complexity have directly absorbed higher levels of human and nonhuman energy…. Such forms of regulation are enormously costly… They can only be maintained and can only function, therefore, in energy-intensive systems where high proportions of nonhuman energy in production liberate human energy for other purposes." (51-52)

The state seeks to govern the periphery as the site of extraction on which the productive center depends, but due to their intensive energy requirements, "The bureaucratic agencies of the modern

[14] This distinction between extraction and production is related to but different from the problem of the "subsumption of nature" and the distinction between extraction and cultivation developed by Boyd et al. (2001; see also Carton, Jönsson, and Bustos 2017). The subsumption of nature framework focuses more narrowly on the materialities of nature and its integration into industrial processes, whereas the distinction between extractive and productive economies comes at the level of socio-economic and political organization. For example, iron mining (which for Boyd et al. is extraction) can occur in a productivist complex integrated with steelmaking and automobile manufacture, while oil palm plantations (which for Boyd et al. are cultivation) can be extractive and disarticulated from local socio-economic development.

state can only occur in extractive peripheries as an imposed, exogenous force and are therefore compelled to act without the corresponding civil organization which its own rationality and operating procedures require" (29). This imposition may generate a number of pathologies, such as oligarchization, rent seizing, and regulatory capture (52-53; cf. Ross 2001).

Bunker's argument reifies a particular form of political organization under the rubric of the 'modern state.' While I agree that there are certain characteristics of the state as a form of political organization that are fundamental to the government of complex societies (Scott 1998), I argue that the political organization of extractive zones, when stabilized over an extended period of time, should be considered not as a diminished or pathologized expression of the ideal-typical modern state (cf. Levitsky and Collier 1997), but rather as a coherent political-economic structure. The 'pathologies' of extractive politics are rather stabilized, functional aspects of what I term an 'extractive regime' (following Gellert 2010). Bunker also recognizes that extraction and production engender distinct configurations of land tenure and resource access (27), and productive and extractive systems comprise "very different ecological, demographic, and social structural evolutionary processes" (46), yet by insisting on the economic and ecological integration of extraction and production, he tends to insist also on the political integration of these formations.

Relatedly, Bunker's analysis tends to privilege particular territorial levels in his description of extractive and productive economies. Namely, the Amazon Basin as an extractive zone, the Brazilian Southeast, Europe, and the US as productive centers. This perspective elides the fractal character of extraction-production relations[15] and the political formations that support them across local, municipal, regional, national, and international levels. It also reinforces an equilibrium picture of cores and peripheries common to world systems analysis and dependency theory, where

[15] Consider by way of contrast Browder and Godfrey's (1997) work on the urbanization of the Amazon.

being peripheral or dependent is an indefinite equilibrium condition perpetuated by seemingly insurmountable structures of political, economic, and ecological inequity. I maintain that a greater attention to the political configuration of extractive regimes and to the interactions of extractive and productivist political-economic formations across multiple levels can open up a richer understanding of the process and contingency of political-economic and environmental change. When and how might an area move from being an extractive periphery to a productive core?[16] How do transitions between extraction and production at different levels interact and spread through systems? And to what degree, *contra* Bunker, are political structures able to catalyze these transformations?

A focus on the state, furthermore, helps to illuminate the importance of territory and processes of 'territorialization' through which states facilitate and structure capitalist extraction and production. The construction of 'territory' is a principal means for securing state control of populations and resources. Elden (2010) defines territory as a political technology that has both economic and strategic dimensions. Territorialization, in Vandergeest and Peluso's (1995) formulation, describes the state's actions to structure the spatial organization of people and their relations to natural resources. Building on these concepts, I use 'territorialization' to describe the construction of political spaces of economic and strategic control. Territorialization is a process of state-building that articulates with other forms of socio-economic control in the construction of extractive and productivist regimes.

Extractive and Productivist Regimes

[16] Zeitlin's (1984) *The Civil Wars in Chile* seeks to answer this question for Chile in the second half of the 19th century.

I argue that extractive and productive economies are supported by distinct types of political arrangements, such that we can differentiate extractive and productivist political-economic *regimes*. A regime is, fundamentally, a mode of rule. In the case of political-economic systems, a regime refers to the configuration of a socio-political order articulated with a mode of production. To use Araghi's phrasing, I am describing regimes as 'the political face of value relations' (2003, 51). I delineate an extractive regime corresponding to an extractive economy, and a productivist regime corresponding to a productive economy.[17] This concept of a political-economic regime bears similarity to the regime concept in regulation theory, which identifies macro-social regimes of social regulation corresponding to different historical forms of accumulation (typically Fordism and post-Fordism) (Aglietta 1979). My usage refers to political-economic regimes not at the global level of industrial regulation theory, or its adaptation to 'world food regimes' described by Friedmann and McMichael (1989) and critiqued by Goodman and Watts (1994). Rather, I am describing extractive and productivist regimes that are component parts of the capitalist world economy.

Extractive and productivist political-economic regimes are thus more specific than the 'capitalist political-economy,' for they describe the character of subsystems within the capitalist world system as either extractive or productivist. These regimes are also more general than a description of particular labor relations or production processes and sectors, where we might

[17] The multiple uses of terms such as 'extraction' and 'production' pose a challenge for choosing an appropriate terminology for these regimes. I describe an 'extractive' regime following the usage of the term for 'extractive industries,' and more specifically Gellert's (2010) existing description of an 'extractive regime.' I do not use the term 'extractivism' or an 'extractivist' regime because extractivism, especially in Amazonian scholarship, may refer to livelihoods centered on harvesting of non-timber forest products such as rubber, although there is also scholarly discussion of extractivism with regard to natural resource extraction (Gudynas 2009; Baletti 2014). On the other hand, where 'mode of production' is used to distinguish an extractive economy from a productive economy, the terms 'production' and 'productive' appear ambiguous, so I refer to a 'productivist' regime corresponding to a particular, intensive mode of production. This usage hearkens to discussions of 'productivism' as an intensifying, modernizing 'regime' in agriculture (Wilson 2001), as well as a more general discursive and material configuration of capitalist development and modernization (Baudrillard 1975; Moore 2015).

identify a 'plantation economy,' a 'petro-economy,' or a 'tech economy' and its attendant political formations. This level of specificity is analogous to the level at which regimes are often discussed in comparative politics, where 'regime' describes the organization of rule within a particular state or polity, such as a 'democratic regime' versus an 'authoritarian regime' (Levitsky and Collier 1997). It is a concept more specific than the state, but more general than the government administration holding power at any particular moment. The difference is that the regime concept in comparative politics is usually concerned narrowly with political institutional structures at the level of the nation-state and does not address the economic question of the forms of accumulation linked to a particular organization of rule. Further description is required in this terminology to link the political regime to an economic form, for example 'bureaucratic authoritarian developmentalism' in Brazil or 'neopatrimonial extractivism'[18] in Indonesia. In the language of comparative politics, then, the Brazilian State since World War II may be said to have passed from a democratic regime to a bureaucratic authoritarian regime back to a democratic regime, but across these transitions the political regime remained committed to modernizing, industrializing development, and so I characterize the Brazilian national political-economic regime throughout the post-WWII period as a productivist regime.

A few points must be clarified. First, where comparative politics' discussion of regimes tends to fall into a 'territorial trap' that limits analysis to the national level (Agnew 1994), I suggest, following Appadurai (1996), that political-economic regimes are fractal features of the capitalist world system, just as the extraction-production dialectic is reproduced across scales. Thus, while relative to the systemic core of the Global North, Brazil represents a zone of extraction, Brazil also has a national core of productivist industry, centered especially in the South and Southeast. For

[18] Exctractivism here refers to extractive industry.

the Brazilian core, the Amazon is a zone of extraction, yet even within the Amazon there are productive urban centers that extract from the hinterlands. At each socially produced spatial level, there is a political-economic regime that articulates a socio-political regulatory structure with a mode of accumulation. From this point of view, we can see clearly how the political character of the regime plays a crucial role in determining patterns of accumulation. At any political level, a regime may govern both extractive and productive processes. Because extraction and production are integrally interdependent and fractal, no regime is absolutely extractive or absolutely productivist; the question is rather one of degree. Nonetheless, it becomes deeply consequential whether the political organization at a particular level is configured in such a way as to promote primarily extraction or production. This political configuration is not entirely autonomous or arbitrary, but rather rooted in the political-economic history of that place. At the same time, the political regime is not entirely determined by economic structures, and it can play a determinant role in how the economy evolves under its control.

For example, I argue that Brazil at the national level is characterized by a productivist political-economic regime that seeks industrialization and broad-based, articulated national development through bureaucratic rule. Historically, the Amazon has been characterized by an extractive regime, where clientelist, *latifundista* political-economic formations have mined timber, minerals, and soils without contributing to more complex economic integration or general well-being. Bunker describes the pathologies of the Brazilian state attempting to extend modern bureaucratic government to the Amazonian extractive zone. While the perversion of modernizing projects certainly occurred, such as the boondoggle of the military's development projects under the Superintendency for Development of the Amazon (SUDAM) (Hecht and Cockburn 1989; Schmink and Wood 1992), I would focus instead on the tenure relations, patronage structures, and

personalistic politics that stabilized and supported an extractive economy in the Amazon region, which constituted a political-economic regime in their own right. Extractive interests had political representation at the national level, just as productivist interests sought to steer development in the Amazon, but these were minority tendencies in the overall structure of their regimes. I argue in this study that since the mid-2000s, the national productivist regime in Brazil has sought to shift the regional economy of the Amazon from a mode of extraction to a mode of production. National productivist pressures have been resisted by some regional elites, threatened by the transformation of the Amazonian extractive regime. At the same time, and in some cases anticipating federal policy, some municipalities in the Amazon have sought to effect a transformation from extraction to production at the municipal level. One example is the municipality of Paragominas, where with the collapse of a timber boom elites sought to shift the economy to manufacture of value-added wood products and industrial soy cultivation (Thaler, Viana, and Toni, n.d.). Their efforts were subsequently supported by the productivist thrust of federal policy. If, by contrast, the national political-economic regime had been extractive, as in Indonesia, municipal elites would have had much more difficulty effecting a municipal productivist transition, as they would have been encompassed by formal and informal institutional structures aimed at siphoning wealth for personal and external enrichment rather than reinvesting in local articulated development. An extractive regime at a higher level may impede a productivist transition at a lower level, while an extractive regime at a lower level may derail or refract higher-level productivist forces. In short, development processes on the ground materialize through nested political-economic regimes across multiple levels, and higher-level regimes are not necessarily determinant of lower levels, but they are conditioning, and lower-level regimes may resist or distort higher level projects.

A brief word on neo-extractivism is also warranted. Some scholars might argue that the 21st-century leftist neoliberal political-economic regime in Brazil (and many other parts of Latin America) is not a productivist regime, but rather a 'neo-extractivist' regime (Gudynas 2009; Baletti 2014) based on a natural resource export economy. I make two observations. First, that extraction certainly continues to exist within the Brazilian national economy, as it does at all scales of the capitalist system. The fact that natural resource extraction is occurring in some zones does not imply that the character of the national political-economic regime is necessarily extractive. The important question is how the value from extraction circulates at the national level. In Brazil, extractive revenues have been reinvested in social programs and infrastructure, which is in keeping with a productivist politics. Of course, as Brazilian political scandals have revealed, billions of dollars from the national oil company have been siphoned off for personal enrichment, in keeping with an extractive politics. Regimes are ever hybrid. To the degree that the national political economy has remained geared toward value-added production and broad-based socio-economic growth, however, I consider the national regime productivist.

Second, some scholars have characterized the expansion of agro-industry in the Amazon as a form of agricultural extraction (Oliveira 2013; Baletti 2014). I maintain that there is a fundamental difference between the capital-intensive, high-productivity agro-industrial soy production and cattle ranching that is emerging in the Amazon region and the low-input, low-productivity, slash-and-burn ranching that it is replacing. While the latter was classically extractive, the new agro-industrial mode of production and the political arrangements that accompany it are productivist and indicative of an incipient regional transition from extraction to production, as I argue in Chapter 6. It should be clear that I am not arguing that the new Amazonian productivism is a 'good' thing, or that it does not entail the inequities and degradations that critics

have described. My point is rather to describe and theorize the processes of change in the local and regional political economies of tropical agro-forest landscapes under contemporary global capitalism. In the Amazon, as everywhere else, the increasing development (wealth, complexity) of the productivist agro-industrial economy is dependent on the underdevelopment (impoverishment, degradation) of extractive economies across multiple scales.

In Chapters 5 and 6 on Indonesia and Brazil, I detail the empirical manifestations of extractive and productivist regimes in those countries. Here, I elaborate briefly on the general characteristics of extractive and productivist regimes.

Extractive Regimes

The extractive regime is the typical political-economic formation of the periphery. European colonialism outside the settler colonies, for example, operated quintessentially as an extractive regime. The institutions constructed and maintained by the colonial state, such as slavery, large land grants, and trade monopolies, were calculated to enrich a narrow domestic elite and the foreign metropole, at the expense of environmental and social degradation in the colony. Acemoglu, Johnson and Robinson (2001) review a number of studies of colonial extraction, noting that in the early 20th century the French extracted 50 percent of the GDP of Dahomey, Britain took in over 17 pounds in taxes from the southern African copperbelt for every pound returned to Northern Rhodesia in development grants, and tax rates on Africans in the Belgian Congo approached 60 percent of their income. They emphasize that the institutions supporting this extraction persisted long after independence. The Mobutu government in Zaire is famous for its depredations, as is Suharto's New Order government in Indonesia for its natural resource plunder. Africanists speak of 'neopatrimonial regimes' as systems of personalistic rule, but these regimes have an explicitly economic component as well, comprising patronage networks, personal

enrichment, and the blurring of public and private interests (Bratton and Van de Walle 1994), making them another iteration of an extractive political-economic regime. The distinction between extractive and productivist regimes bears similarities also to the distinction between predatory and developmental states (P. Evans 1995), but that distinction is generally limited to national-level analysis, ignores the integral interdependence of extraction (predation) and production (development), and fails to situate predatory and developmental regimes within a world system where national level political formations are co-produced with extractive and productivist regimes across multiple levels (Gellert 2010).

Unsustainable natural resource exploitation is a hallmark of extractive economies, and is enabled and maintained by particular political formations. Looking specifically at Southeast Asia, Michael Ross (2001) describes the 'institutional breakdown' he sees emerging from tropical timber booms. He details the interactions of rent-seeking by private actors and government officials and rent-seizing by bureaucrats who seek to control and allocate rents from the windfall profits of the tropical timber trade. Ross focuses on the dismantling of regulatory institutions during an extractive boom, concluding that "state institutions can become endogenous to the pursuit of rents" (202), yet in the case of Indonesia, as Ross recognizes, there were few regulatory institutions to be dismantled to begin with. While Ross' analysis is limited to a single commodity boom, under the extractive regime in Indonesia, as elsewhere, institutions are integrally 'endogenous to the pursuit of rents,' by the New Order government, by the Dutch colonial government, by the Dutch East India Company, and their associates. The nationalist post-independence government of Sukarno was consumed by political struggles and ultimately did little to alter the fundamentally extractive character of Indonesia's political-economic regime.

Paul Gellert's (2010) definition of an extractive regime, based on the case of Indonesia, comes closest to my use of the concept. Gellert builds on world systems analysis and Bunker's work on extractive and productive economies to define an extractive regime as a historically produced, concrete economic and political order based on natural resource extraction. He notes that extractive regimes can access and use natural resources through structures of domination without constructing complex, Weberian bureaucracies, and that the spatiality of the regime will be specific to the resources in question. Gellert argues that the extractive regime concept can help move beyond the predeterminations of some strands of world systems and dependency thinking to attend to the ways peripheral states may reshape accumulation processes.

My definition of extractive regimes differs from Gellert's in two important ways. First, Gellert defines an extractive regime only in relation to the extraction of natural resource-based commodities. Although he recognizes that the exploitation of peripheral labor is also fundamental to capitalist development (35), Gellert limits his discussion to natural resources in order to attend to the particular materialities and institutional characteristics of natural resource extraction. My concern, however, is with the broader extraction versus production dialectic and its associated political economic forms, which encompass extraction from peripheral social and ecological systems and accumulation in productive centers. I therefore link extractive labor structures and natural resource extraction under my extractive regime concept.

Second, Gellert defines an extractive regime as a limited historical form that emerges in a particular world-historical moment of post-WWII developmentalism and globalization. I generalize the extractive regime as an ideal type of political-economic organization in the capitalist world system. I am interested in production/extraction, core/periphery dynamics in the *longue durée* of historical capitalism, and from this perspective there is a continuity, for example, between

the political structures of colonial and post-colonial extraction, and between the Suharto-era extractive regime in Indonesia and post-Suharto extractive neoliberalism, as Gellert also recognizes (50), or between colonial and post-colonial natural resource extraction in the Brazilian Amazon.

Finally, Gellert recognizes that extraction occurs at different scales throughout the world system, and suggests the possibility of extending his extractive regime concept to the 'internal peripheries' of core countries (30 fn. 2), but in his exposition he focuses almost exclusively on the national-level political-economic regime. My concern is more explicitly with the multi-level character of extractive and productivist regimes and the interactions across levels between, for example, a productivist national regime in Brazil and an extractive regional or municipal regime in the Brazilian Amazon, or attempts to alter the extractive character of a district-level regime in Indonesia while confronted by pressures from extractive provincial and national regimes.

A note on speculation is also important. Speculation, or "the purchase (or sale) of goods with a view to re-sale (re-purchase) at a later date, where the motive behind such action is the expectation of a change in the relevant prices relatively to the ruling price and not a gain accruing through their use, or any kind of transformation effected in them or their transfer between different markets" (Kaldor 1939, 1), is a dynamic common to both extractive and productive economies of capitalism. Speculation may alter productivist systems, for example by feeding real estate bubbles or stock market bubbles (Kindleberger 1978; Schwartz 2009), and extractive systems, for example by feeding land grabs, gold rushes, or other commodity booms (Hecht 1985; Hecht 1993; Tsing 2000a). Speculation may become especially prominent during periods of high financialization of the economic system (Arrighi 1994), leading to surprising convergences of high finance with frontier extraction, as Anna Tsing (2000a) describes in the case of the Bre-X gold find in

Indonesian Borneo, and as can be seen with the involvement of financier Daniel Dantas in cattle ranching in Southern Pará (Manechini 2008) and the imbroglio of a Rothschild investment in coal mining in East Kalimantan (Kahn and Mellor 2013). These speculative dynamics are significant to the operation of different extractive and productivist regimes, and I describe the role of speculation in the political economies of the Amazon and Eastern Borneo. Nonetheless, I view these dynamics as secondary to the fundamental material extraction and production processes of the different economies,[19] and I maintain that the critical distinction for the question of land sparing forest governance is between extractive and productivist regimes.

I have devoted more space to delineating the extractive regime because of my concern to show that it is a distinct political-economic formation and not simply a diminished or externally-imposed structure of a general, homogenous 'modern state.' The following section completes the discussion of extraction and production with a brief description of productivist regimes.

Productivist Regimes

The productivist regime is the typical political-economic formation of core zones of the world economy. Productivist core economies are characterized by high rates of fixed capital investment or 'technomass' and infrastructural density, strong inter-sectoral linkages, and economies of scale (Hirschman 1977; Bunker 1985). This mode of production is supported by a characteristic set of political institutions centered on the complex bureaucratic formations of the modern state, which regulates production in the core and seeks to guarantee extraction in the peripheries through its relations with extractive regimes. There is an extensive literature on the

[19] Jason Moore argues differently that contemporary financialization is of a different quality from the previous five centuries of historical capitalism, surpassing the exhausted historical marriage of 'productivity and plunder' (production and extraction) through the instantiation of general financialized extraction throughout the world system (Moore 2012, 4–5). Be that as it may, I find the divergent trajectories of Indonesian and Brazilian land use change best explained by a continued focus on extraction and production, as opposed to their subsumption under generalized financialization.

'varieties of capitalism' that discusses institutional variation among advanced industrial economies (Hall and Soskice 2001). More important here are the general institutions of productivist regimes that these economies share. Acemoglu, Johnson, and Robinson (2001) highlight constraints on government expropriation, an independent judiciary, property rights enforcement, and institutional support for access to education and protection of civil liberties (1370 fn. 3), which are the foundational institutions of a liberal political-economic order and broad-based socio-economic development in modern capitalist societies (North 1981). Students of developmentalism, focused more narrowly on the "late-late industrializers" (Kohli 2004, 8) of the Global South, have also emphasized the importance of effective bureaucracies and alliances between the state and capital to promote industrial development (P. Evans 1995; Kohli 2004). As in the case of predatory or neopatrimonial states, these descriptions of developmental states are generally limited to the national level and do not situate political-economic structures within the broader world system (Gellert 2010); nonetheless, they provide a further illustration of the interaction of political and economic structures in productivist capitalist development.

In the following sections, I propose concepts for analyzing the interactions between extractive and productivist regimes across multiple levels through attention to the political-economic assemblages that support particular kinds of transformation.

Complexes and Coalitions

Complexes

I have discussed extractive and productivist regimes as analytical frames encompassing the socio-political and economic ordering of geographically-defined subsystems of the capitalist world system. Political-economic regimes scale across socially-produced spatial levels that articulate with materially-grounded modes of production and accumulation. At a fundamental level, the

capitalist system is an endless dialectic of extraction and production. At different levels of the system and in different historical periods, however, there emerge assemblages of actors, institutions, practices, and discourses that seek to advance particular political-economic projects, i.e., to structure accumulation in a particular way (Li 2007a). I call these assemblages *complexes*. Like a regime, a complex is both material and ideational. A complex is linked to a particular fraction of capital, however large or small, and includes the epistemic and governmental formations that help support and direct that fraction. At the broadest level, we can speak of macro-level political-economic phenomena such as Fordism and neoliberalism in terms of complexes. There is a neoliberal complex animated by the ideology of the Washington Consensus and advancing a project of privatization, marketization, and deregulation through the actions and interactions of governments, international financial institutions such as the World Bank and International Monetary Fund, private corporations, and others. At a less general level, we can speak of the military-industrial complex in the United States as an assemblage of the US Armed Forces, defense contractors, politicians, and others united by a project for militarized political power and economic growth.

In this frame, I argue that ecological modernization discourse has been coupled with the emergence of a global 'green growth complex.' As I described at the beginning of the chapter, ecological modernization discourse has supported a conciliation of environmentalist NGOs, corporations, and government actors to pursue improved environmental conditions *through* economic development. UNEP's launch in 2008 of its Green Economy Initiative was a landmark in the consolidation of this complex. "Mobilizing and re-focusing the global economy towards investments in clean technologies and 'natural' infrastructure such as forests and soils is the best bet for real growth, combating climate change and triggering an employment boom in the 21st

century," UNEP (2008) affirmed. The 'green growth' frame was quickly expanded into a holistic economic perspective: UNEP's Green Economy Report in 2011 included chapters on agriculture, fisheries, water, forests, renewable energy, manufacturing, waste, buildings, transport, tourism, cities, policy 'enabling conditions,' and finance (UNEP 2011). The green growth complex at the international level integrates intergovernmental organizations such as UNEP and the Global Green Growth Institute (established in 2012), multi-lateral development banks, bilateral development agencies, transnational corporations, sustainability researchers, and transnational environmentalist and development NGOs. The complex is reproduced across levels in the world system. Sugarcane ethanol producers in Brazil are a part of the green growth complex, as are RSPO-certified palm oil producers in Indonesia, along with national government agencies and domestic NGOs. The green growth project takes different forms according to the socio-political and material characteristics of different subsystems, and it will not necessarily be manifested in all places at all times.

Within the green growth complex, there are a variety of subsidiary complexes related to particular industrial sectors, particular commodities, and particular transformative projects, each associated with different fractions of capital. Thus there is a solar energy complex, a sustainable soy complex (Baletti 2014; Elgert 2012), and a REDD complex. Complexes may overlap and actors may participate in multiple complexes – the complex, like any fraction of capital, is not self-contained, but rather identifies a cluster (an assemblage) within a much larger network (the world system). I define the land sparing complex as an assemblage of actors, institutions, practices, and discourses seeking to advance land sparing as a political-economic project. The land sparing complex is centered on a fraction of agro-industrial capital, and it falls within the broader green growth complex. TNC plays a key role in the land sparing complex at multiple levels, as it does in the green growth complex more generally.

Coalitions

A complex describes an assemblage, a set of relationships. Complexes do not act as units, however. Rather, complexes advance their projects in different places and moments through the constitution of political-economic *coalitions*. Coalitions emerge when members of a complex ally with each other (and possibly with other actors) in order to advance particular projects or goals that support their common agenda. These coalitions are the bridge between a complex and the implementation of policy. Thus, the land sparing complex acts through land sparing coalitions. These coalitions are characterized as 'developmental coalitions' or 'growth coalitions' in the sociological and development studies literature, i.e., social groupings dedicated to promoting particular processes of socio-economic and environmental transformation (P. Evans 1995; Rudel 2009). Different coalitions may coincide or clash with each other in a particular space or across multiple levels, and these interactions comprise the tectonics between different fractions of capital and their associated complexes.

In the case of land sparing, in any particular place and time, a subset of actors within the land sparing complex may be active in promoting agricultural intensification and forest conservation as a land sparing coalition. In the chapters that follow, I describe land sparing coalitions operating at different levels from frontier municipalities to national capitals. In Chapter 4, I discuss the development of green growth and land sparing ideas at TNC and the changing relations and practices of the organization as it has participated in assembling the global green growth and land sparing complexes. In Chapter 5, I describe the land sparing complex in Indonesia and the particular challenges it has faced, as I examine attempts to mobilize land sparing coalitions at the national, provincial, and district levels. In Chapter 6, I describe the land sparing complex in

Brazil and the formation and activity of land sparing coalitions at the national, state, and municipal levels.

In summary, I have put forward an analytical framework based on extractive and productivist regimes as political-economic formations comprising economic structures of production and accumulation and socio-political structures that stabilize, regulate, and reproduce those economic structures. Extractive regimes exhibit institutional structures directed towards enabling socio-ecological extraction for the benefit of a narrow elite and external economies at a cost of internal socio-ecological degradation. Productivist regimes exhibit institutional structures aimed at concentrating resources to support complex and broad-based structures of articulated production and accumulation. These regimes coalesce at multiple socially-constructed spatial levels within the capitalist world system. At different levels of the system and in different historical periods, complexes emerge as assemblages of actors, institutions, practices, and discourses anchored in particular fractions of capital and seeking to advance particular political-economic projects. One such complex is the green growth complex; another is the land sparing complex that is a component of it. Complexes act through coalitions, where members of a complex ally with each other and sometimes other actors in order to advance their agenda at a particular level and in a particular moment, in contestation or cooperation with other actors and coalitions. Land sparing coalitions emerge in different configurations and with different effects and durations in Amazonian municipalities, Indonesian districts, and at other levels up to the global. This framework allows us to analyze the interactions between extractive and productivist regimes across multiple levels through attention to the complexes and coalitions that support particular kinds of transformation at particular conjunctures.

My first purpose in the following chapters is to use this analytical framework to help explain trajectories of forest governance and land use change in Brazil and Indonesia. My second purpose is to situate these divergent trajectories in a systemic perspective to evaluate more general questions related to the nature of the relationship between extraction and production, the effectiveness of land sparing, and the systemic possibility of ecological modernization.

Part II contains the empirical chapters of the dissertation. Chapter 4 provides a genealogy of the land sparing idea within a key environmental actor (TNC), while Chapters 5 and 6 illustrate the operation of extractive and productivist regimes, the land sparing complex, and land sparing coalitions across different tropical forest landscapes in Eastern Borneo and the Amazon. Chapter 7 focuses on the dialectical relation between extraction and production by tracing the linkages between productivist development in the Brazilian Amazon and accelerating deforestation on coupled South American frontiers.

PART II

CHAPTER 4

LAND SPARING, ECOLOGICAL MODERNIZATION, AND FOREST CONSERVATION AT THE NATURE CONSERVANCY

"The world runs on capitalism; that drives everything.
How do you make conservation compatible with that?"

- TNC employee, Arlington, VA, 11 August 2015

"At The Nature Conservancy, we believe that production systems must intensify.
Intensification must be at the center of conservation thinking about agriculture."

- *TNC* Global Lands Report (2015, 28)

Founded in the United States in 1951 as an environmental nonprofit group, The Nature Conservancy emerged out of the Ecologists Union, a splinter faction of the Ecological Society of America, and was modeled in part on the nature conservancy programs of the British Government. TNC's signature strategy was to purchase land for conservation, beginning with the purchase of 60 acres of river gorge near New York City in 1955. The organization grew steadily during the blossoming of the environmental movement in the 1960s and 1970s, eventually operating in all 50 states and launching programs in Latin America. TNC then grew rapidly in the 1980s, nearly quadrupling its annual revenue from $58 million to $222 million and expanding its staff by an order of magnitude from 77 employees to 933 (Ottaway and Stephens 2003). During the 1990s, TNC underwent a further metamorphosis as corporate donations and bilateral and multilateral funding began to make up an ever larger part of the organization's budget. Corporate donations grew from $1.8 million in 1993 to $225 million in 2002, at which time total annual revenue reached

nearly $1 billion (Ottaway and Stephens 2003). By the 2010s, the organization had over $6 billion in assets, 3,800 staff members, and activities in over 30 countries.

In the late 1980s, TNC began working on forest conservation in Brazil, followed several years later by the beginning of forest conservation activities in Indonesia. Early international efforts maintained the wilderness-oriented, 'fortress conservation' approach TNC had taken in the U.S., focusing initially on improving forest conservation in protected areas through the 'Parks in Peril' program in Brazil and a program at Lore Lindu National Park in Indonesia. In 1997, TNC partnered with American Electric to launch a project around Noel Kempff National Park in Bolivia that became the world's first independently-verified REDD project, preceding intergovernmental discussions on REDD at the UNFCCC by a decade. Subsequently, TNC was instrumental in the establishment of the World Bank's Forest Carbon Partnership Facility in 2007, and it launched REDD pilot projects in Brazil and Indonesia in 2009. By 2015, TNC's international Forests and Climate program had been rolled into a new Global Lands program, and the organization was promoting agricultural intensification as a strategy for forest conservation, including through projects for 'sustainable cacao' and 'sustainable beef' in the Amazon and 'sustainable oil palm' in Borneo. Why did an organization focused on biodiversity conservation start devoting resources to increasing agricultural productivity? How did land sparing become the central policy idea of TNC's tropical forest programs?

This chapter traces the emergence of land sparing as the core of TNC's tropical forest conservation strategy. The land sparing hypothesis is intimately linked with a broader discourse of ecological modernization, thus I situate the history of land sparing at TNC within a more general exploration of the consolidation of ecological modernization perspectives in the organization. The purpose of this chapter is to provide a history of ideas and a history of practice that links the

discursive and material dimensions of socio-ecological change in tropical forest landscapes. This account can then serve as a background for understanding the ideas and strategies of tropical forest policy-making in Indonesia and Brazil described in the subsequent chapters. Tropical forest governance emerges through shifts in ideas about conservation in articulation with shifts in ecological and political-economic relations. A history of The Nature Conservancy's tropical forest programs illuminates the recursive interactions between ideas and experience out of which a forest governance architecture has emerged.

It is especially apt to explore these developments through the lens of an environmental NGO. As Princen et al. (1994) argue, international environmental NGOs make 'translational linkages' that connect the local with the global and the biophysical with the political. In the characterization of the multi-level governance literature, TNC operates as a 'boundary' or 'bridging' organization that "play[s] an intermediary function between different arenas, levels, [and] scales and facilitate[s] co-production of knowledge" (Mwangi and Wardell 2012, 87). Shifts in discourse and practice at TNC thus not only encapsulate broader transitions in environmental politics, but also have been instrumental to the production of the global green governance complex. Empirical material in this chapter is drawn primarily from my organizational ethnography of TNC's tropical forest programs.

Land, Nature, and The Nature Conservancy

What exactly is the 'nature' that TNC seeks to conserve? David Morine, who was in charge of land acquisition for TNC from 1972 to 1987, recalls that TNC's early goal was to 'save land,' which they did by raising money and 'doing deals' to purchase property or conservation easements. "Land Conservation Through Private Action" was TNC's motto in 1972 (Morine 2012). 'Land' and the 'nature' upon it were conceived largely in the romantic terms of Muir and Thoreau that

Martínez-Alier terms a 'cult of the wilderness' (2002; see also Cronon 1996), evoking a pristine and primeval 'nature' unsullied by humans. As TNC developed its first long-range plan in the early 1970s, Robert Jenkins, TNC's chief scientist, argued that TNC should not just buy land, but should focus on preserving biotic diversity, and this goal was written into the organization's 1974 plan (Morine 2012). Preservation of biodiversity gave a systematic, scientific basis to TNC's conservation efforts. Subsequently, the centrality of biodiversity conservation gave way to a more anthropocentric focus on ecosystem services. Tropical rainforests have been one of TNC's conservation priorities since the early years of the organization's international expansion in the 1990s, a focus that has been maintained even as the discursive framing of tropical forest conservation has changed. An emphasis on the rich biodiversity of tropical forests (TNC 2008a) is now supplemented by assertions of the importance of tropical rainforests for climate change mitigation (TNC 2015), but these scientific arguments are inevitably layered on top of the Edenic, wilderness narratives that have colored tropical forest conservation since colonial times (Grove 1995). Whatever the 'nature' may be that The Nature Conservancy seeks to conserve, tropical forests are an important part of it, and have been and remain a priority of TNC's global conservation efforts.

Eco-Modernism, REDD, and Land Sparing

Maarten Hajer pioneered the study of policy discourse in environmental politics with his 1995 book, *The Politics of Environmental Discourse: Ecological Modernization and the Policy Process.* Hajer argues that discourses produce knowledge about an issue and help to define and limit a field of action, but different actors participate in discourses from different standpoints, and discourses may contain multiple different story lines and contradictions. In the case of land sparing and TNC, three fields of policy discourse and policy making are of prime importance: the

encompassing field of ecological modernization (or 'eco-modernism'), and under the umbrella of ecological modernization, the discourses of REDD and land sparing.

By way of overview, this chapter locates the roots of land sparing at TNC in the development during the 1970s of synergistic thinking about the relationship between the environment and capitalist development that gave rise to ecological modernization discourse and the concepts of 'sustainable development' and 'green growth.' REDD and land sparing are both examples of purported pathways for simultaneously improving environmental quality and promoting economic growth (i.e., green growth). Ecological modernization anticipates and incorporates environmental risks into economic development, thus it requires planning and 'design.' The creation of metrics and planning tools for sustainable development is touted as 'science-based,' effectively re-situating science within a regulatory project. In conservation praxis, green growth requires taking into account both 'natural' and 'working' lands, and regional and global socio-environmental problems undermine enclosed nature preserves or REDD projects, so TNC has sought to gain scale in its conservation activities, adopting a focus on 'working landscapes' and jurisdictional REDD. While a working landscape could in principle be land sharing or land sparing, relying on more or less concentrated and intensified production, the capitalist modernization narrative (and TNC's government and corporate partners) favors productivism and intensification, and so TNC has pragmatically adopted land sparing as its landscape-level strategy for achieving forest conservation and economic development. As discourses tend to marginalize and erase their alternatives and their unintended consequences, land sparing has come to appear in TNC discourse as the only viable way of reducing tropical deforestation, and ecological modernization discourse has come to paint the reduction of environmental degradation with economic development as an inevitability, while both discourses

gloss over concerns about equity and the displacement of degradation.

Origins of Ecological Modernization

Hajer (1995) describes the origins and consolidation of ecological modernization discourse in the 1970s and 1980s. He defines ecological modernization as "the discourse that recognizes the structural character of the environmental problematique but none the less assumes that existing political, economic, and social institutions can internalize the care for the environment" (25). Ecological modernization holds that environmental management is a positive-sum game. Environmental degradation is economically inefficient. While early environmental policies of the 1960s and 1970s were generally *ex post*, remedial measures, ecological modernization held that policy should be anticipatory, so that environmental costs could be factored into the economic and institutional model *ex ante*. Hajer identifies three principal characteristics of ecological modernization discourse: 1) environmental degradation is rendered calculable and monetizable; 2) economic growth and the resolution of environmental problems are seen as compatible; and 3) positive-sum outcomes from environmental protection require collective action, therefore environmental protection is understood as a problem of management (26).

The emergence of the Western environmental movement in the late 1960s and early 1970s was characterized by apocalyptic alarm at what was suddenly understood as global ecological crisis (e.g., Meadows et al. 1972). During the 1970s, energies of the radical environmental movement focused in particular on opposing nuclear power, while the ingredients of ecological modernization were incubated in international organizations such as the OECD, IUCN, and UNEP. Synergistic thinking in these international organizations emerged partly in response to the rift of the 1972 United Nations Conference on the Human Environment between Northern demands for environmental protection and Southern demands for development. In the 1980s, Hajer recounts,

"ecological modernization conquered the discursive space of environmental politics" (263). While much intellectual work took place in positioning ecological modernization as a coherent policy discourse, Hajer indicates several elements of the 1980s conjuncture that favored ecological modernization's ascendance. These elements include the economic recession of the late 1970s, which reinforced the priority of economics over environmental concerns; the professionalization of the environmental movement, which shifted environmental NGOs toward more strategic and less confrontational action; and the emergence of new emblematic environmental issues such as acid rain and ozone depletion, which relative to nuclear power were less clearly aligned with radical counter-cultural critique and more amenable to pragmatic, management 'solutions' (94-95).

Hajer's account must also be situated within the broader processes of political-economic neoliberalization that gained strength during the 1980s. For instance, the professionalization and integration of environmental NGOs in participatory environmental policy making; the rise of regulatory science; strengthening relationships between corporations, NGOs, and government; and the monetization and commodification of the environment were all deeply integrated with generalized processes of deregulation, marketization, and decentralized governance that characterize neoliberal political economy (James McCarthy and Prudham 2004; Castree 2010b). These macro-level political economic transformations of neoliberalization, and the more specific processes associated with the emergence of ecological modernization discourse, are exemplified in the organizational history of The Nature Conservancy.

Ecological Modernization at The Nature Conservancy: Landscapes, New Conservation Science, and Green Growth

Two principles form the core of TNC's conservation ideology: conservation at TNC is 'science-based,' and it is 'pragmatic.' Pragmatism in TNC parlance generally refers to the search for practical solutions to problems, meaning that TNC's actions are not so much science-driven as they are driven by what the organization perceives as the prevailing structure of opportunities and constraints, while TNC's goals and pragmatic actions are defined and justified in scientific terms. Pragmatism as a guiding principle for the organization is as old as TNC itself. In Morine's recounting of TNC's origin story, TNC as an offshoot of the Ecological Society of America was a purely scientific organization:

> "Academics would gather a few times a year to read and discuss papers relating to the natural world. The bulk of these papers were given to documenting areas that were being lost. When the discussion turned to a very attractive piece of the Mianus River Gorge that was about to be developed, someone noted that TNC had $4,000 in the kitty and rather than just sitting around discussing the loss of natural areas, why not do something about it?" (Morine 2012, 13)

Mianus River Gorge became TNC's first land purchase, launching 'land conservation through private action.' This approach signaled TNC's pragmatism as a search for solutions to problems or the achievement of goals within what is understood to be a structure of opportunities and constraints outside of the actor's control. For TNC, capitalist markets are a structure outside of its control, and pragmatic action means seeking conservation – of land, biodiversity, or ecosystem services – within and through those markets. As Timothy Luke observes in an incisive analysis,

> "Because of what has happened to Nature, how capital operates, and where resources for change must be solicited, TNC does what it can. It pragmatically, or perhaps uncritically, accepts these realities as background conditions, and then tries to do something positive within the constraints imposed by these limitations. Yet, as a result, the tenets and tenor of the Conservancy's operations as an 'environmentalist organization' are those of almost complete compliance, and not those of radical resistance to this system of political economy" (Luke 1997, 57)

At its core, pragmatism is a commitment to action above ideology. As one TNC executive affirmed to me in an interview, "TNC is not afraid to do stuff. …We aren't advisors, we're doers" (TNC46 150807).[20] Pragmatism allows TNC to take action to solve problems, and reciprocally TNC's experiences on the ground inform its search for pragmatic 'solutions' in the policy world. This pragmatic loop is central to how TNC operates.

In TNC's early incarnation as a US-focused organization trying to save land through real estate deals, pragmatism meant working within and through land markets. Still, these pragmatic land acquisitions were motivated by a wilderness ideal of 'saving' land from development. In Morine's view, "There is no such thing as 'limited development.' You can't have it both ways. You're either saving land or you're developing it. There's no middle ground" (2012, 77). From the 1980s onwards, changes in TNC's conservation science, conservation strategy, and organizational structure transformed the organization from a US-focused wilderness land trust to a transnational NGO at the forefront of ecological modernization policy. Three interrelated transitions helped drive this transformation: the scaling up of conservation interventions to a 'landscape approach,' the development of 'New Conservation Science,' and the embrace of the idea of 'green growth.'

Scaling up: Eco-Regions and a Landscape Approach

As TNC developed its first long-range plan in the early 1970s, Robert Jenkins, the organization's chief scientist, argued that TNC should not just buy land, but should focus on preserving biotic diversity, and this goal was enshrined in TNC's 1974 plan (Morine 2012). TNC began to target its land purchases to protecting biodiversity, but as one long-time staffer recalled,

[20] Interview references are given using a unique identifying code for each interviewee, comprising a combination of letters and numbers, followed by the date on which the interview took place, written in yymmdd format.

"environmentalists would try to save 300 acres for a rare orchid, and we would get nowhere. The 'buy and hold preserves' model wasn't getting us where we needed to go. We were protecting 1000 acres a day, but you almost couldn't see it, and our scientists were telling us, 'The climate is changing and isolated reserves won't be viable'" (TNC44 150715). TNC sought ways to 'gain scale' in its conservation activities, developing a number of new conservation tactics. This move to larger scales was supported by an expanded scientific and planning apparatus, the brainchild of TNC President John Sawhill, that TNC branded 'Conservation by Design.'

Conservation by Design, which debuted in 1995, launched the eco-regional planning paradigm at TNC. TNC's objective would be to develop a representative conservation 'portfolio' across the different eco-regions where the organization worked, with the goal of effectively conserving 10 percent of every major habitat type by 2015. TNC's mission at this time was "to preserve the plants, animals and natural communities that represent the diversity of life on Earth by protecting the lands and waters they need to survive" (TNC 2006). TNC scientists spearheaded eco-regional analyses at the global level and regional levels. In Latin America, where eco-regional mapping and prioritization were taken very seriously, scientists identified 'crisis' and 'opportunity' eco-regions and conducted threat mapping, leading to new strategic focuses, such as the development of a TNC program in Patagonia (TNC49 150811). Implicit in the shift to an eco-regional focus was a reconceptualization of the relation between environmental protection and social issues. In Sawhill's words, "It's not good enough anymore to fence nature away from people." As one journalist put it, instead of seeking to preserve "living museums of primeval America," TNC would seek "to protect entire evolving ecosystems – including the humans who lived and worked in them" (Weisman 1993).

In the late 1990s, as TNC began to seek larger-scale conservation impacts under its Conservation by Design framework, the organization orchestrated several innovative deals that helped to consolidate TNC's strategy of conservation in working landscapes and reinforced ideas in the organization about potential synergies between environmental protection and economic production. In 1998, TNC's Maine chapter took advantage of the sell-off of large tracts of timberland by paper companies in northern Maine to launch an unprecedented fundraising campaign in support of a $35 million bid to buy out 200,000 acres of land on the St. John River from International Paper. This deal not only raised TNC's fundraising horizon, showing that "for the right project, people were willing to step forward" with large donations (TNC44 150715), it also helped consolidate a 'multiple use' approach to conservation. Because of the timber supply contracts on the property, and because of the debts incurred in order to make the purchase, TNC continued logging in portions of the St. John property. This form of use met with little opposition, however, since TNC's purchase was protecting the land from other forms of development. With the St. John purchase, "You now have environmentalists who are not just preservationists," in the words of one TNC employee (TNC44 150715).[21] In a second innovative deal in Maine's North Woods, TNC bought out a $50 million loan from John Hancock Life Insurance Company to Great Northern Paper. TNC used the buyout to forgive $14 million of the loan in exchange for 40,000 acres of the paper company's land near a state park, and they lowered the interest rate on the loan in exchange for conservation easements on another approximately 200,000 acres. As one TNC staffer describes this move, "TNC had gone from a retail buyer to a wholesale buyer to a financier of a paper company in an effort to save forest and jobs" (TNC44 150715).

[21] These multiple use arrangements have occasionally attracted strong criticism, as in the case of oil production in a Texas refuge for the endangered Attwater's prairie chicken (Gillis 2014).

Eco-Pragmatism and New Conservation Science

The scaling up of TNC's conservation strategy to the eco-regional level and the incorporation of socio-economic considerations into TNC programs were articulated with a new shift in conservation science at the organization. While from the 1970s to the 1990s, TNC moved from an opportunistic approach to land acquisition to a systematic strategy for biodiversity conservation based on eco-regional assessments, from the 1990s to the 2000s the organization increasingly adopted a more anthropocentric discourse of 'eco-pragmatism' anchored by 'ecosystem services' concepts within a framework of 'New Conservation Science.' The ecosystem services framework conceptualizes ecological processes in terms of their value to human society, enabling their classification, valuation, and commodification (Robertson 2012). Ecosystem services concepts gained strength during the 1990s through the construction of market-based environmental governance mechanisms such as emissions trading schemes (e.g., the Kyoto Protocol), wetlands banking, and payments-for-ecosystem services (PES) programs, including a national PES program in Costa Rica and REDD projects like TNC's Noel Kempff experiment in Bolivia. The Millennium Ecosystem Assessment, launched by the United Nations in 2001, marked the consolidation of the ecosystem services framework in global environmental discourse.

The emergence of the ecosystem services framework was a key dimension of the neoliberalization of environmental policy, and it coincided with increasing pressures on environmental NGOs from local communities and indigenous rights activists to reconcile conservation with people and their livelihoods (Brockington 2002; Chapin 2004). These tendencies fused at TNC into a discourse of 'eco-pragmatism.' Eco-pragmatism is an ideological perspective on conservation practice that grounds itself epistemically in New Conservation Science. The shift to eco-pragmatism and New Conservation Science at TNC was led by Peter

Kareiva, TNC's chief scientist from 2002 to 2015, and solidified under Mark Tercek, TNC's President since 2008 and a former Goldman Sachs investment banker, who promoted Kareiva to a spot on TNC's Executive Team (Max 2014).

Kareiva has often proclaimed himself "not a biodiversity guy" (TNC49 150811). In 2012, he and two colleagues published the essay "Conservation in the Anthropocene," which captures the essence of Kareiva's eco-pragmatist ideology. The essay condemns biodiversity-focused conservation, advocating instead a focus on 'working landscapes.' "Instead of scolding capitalism," wrote Kareiva et al., "conservationists should partner with corporations in a science-based effort to integrate the value of nature's benefits into their operations and cultures. Instead of pursuing the protection of biodiversity for biodiversity's sake, a new conservation should seek to enhance those natural systems that benefit the widest number of people" (Kareiva, Marvier, and Lalasz 2012). Kareiva's essay provoked a backlash from a number of eminent conservation scientists, and the conflict generated high tension within TNC. As one TNC scientist recalls, the hallway talk at TNC science meetings was pointed: "What are we doing? Are we conserving biodiversity, or delivering water to the city of Bogotá?" (TNC49 150811). The controversy led to discontent among some donors and the departures of some TNC staff, but the shift to ecosystem services and a more anthropocentric conservation ideology was consolidated. A former TNC scientist sees that "TNC has moved aggressively to a human-centered view of the natural world. They attempt to straddle it, but they are now more about the human use of nature" (TNC45 150727).

Kareiva's anthropocentric, ecosystem services perspective is couched as eco-pragmatism, situating it as a continuation of the pragmatic approach to conservation that is at the core of TNC's organizational identity. In TNC's early incarnation as a US-focused organization trying to save

land through real estate deals, pragmatism meant working within and through land markets. In the move toward ecosystem services and anthropocentric conservation, eco-pragmatism means the acceptance of corporate industrial capitalism and attempts to work within and through the structures and processes of corporate globalization. Global capitalist development is inevitable: "Just as the United States was dammed, logged, and crisscrossed by roads," Kareiva et al. (2012) proclaim, "it is likely that much of the Amazon will be as well." Kareiva and others claim that eco-pragmatism is scientifically justified by the failures of traditional conservation, the unreality of conservationist ideals of pristine wilderness, and the hitherto underappreciated resilience of ecological systems. In counterpoint, they promote a New Conservation Science that sees nature as a "a bundle of ecosystem services" and seeks to "help humanity to domesticate nature more wisely" (Kareiva et al. 2007; Kareiva and Marvier 2012). As Doak et al. (2014) have cogently demonstrated, this reorientation of New Conservation Science has limited support in biological or social science, and is justified primarily according to a belief system that prioritizes the needs and wants of humans over any rights or values of nature.

Regardless of its scientific basis, the move to eco-pragmatism and New Conservation Science at TNC, with its concomitant focus on working landscapes and economic development, enhanced TNC's ability to build corporate partnerships and attract funding from governments, corporations, and foundations, which lent further support to TNC's efforts to gain scale. Finally, in a third dimension of TNC's transformation, a focus on the human use of nature at the landscape scale has been tied to the emergence of a belief in 'green growth' and the compatibility of environmental protection and economic development. In other words, TNC has become a central participant in ecological modernization discourse.

Green Growth and Ecological Modernization

From the 1970s wilderness perspective expressed by Morine – "You can't have it both ways. You're either saving land or you're developing it," (2012, 77) – TNC moved during the 1990s and 2000s toward the view, asserted by current TNC President Mark Tercek, that "economic growth and environmental stewardship are not mutually exclusive, and that in fact, saving nature is the smartest commercial investment any business or government can make" (Tercek 2017). TNC has a long history of creative use of markets and other financial and regulatory mechanisms in the pursuit of conservation. Even in the 1970s, articles about TNC "began to point out how it was run by lawyers and MBAs, how it wheeled and dealed, how it focused on the 'bottom line'" (Morine 2012, 43). TNC's original mantra was 'bucks and acres,' and it used a range of acquisitions, bequests, easements, and other transactions to preserve vast areas of land. In the late 1990s, deals such as those in the Maine North Woods pioneered new market approaches to conservation in working landscapes. From the business background of TNC employees, organizational relationships with corporations and wealthy donors, and a pragmatic use of business approaches to conservation, it was no great leap for TNC staff to begin to argue that environmental protection and economic development could go hand in hand.

While always distinguished among conservation groups by its business acumen, TNC under Tercek, the former investment banker, has further burnished its "corporate sheen" (TNC49 150811) and become a vocal proponent of "the business case for nature" (Tercek and Adams 2013, 165). In 2006, TNC founded the Natural Capital Project in collaboration with Stanford University, WWF, and the University of Minnesota, in order to map and value ecosystem services to provide a 'scientific' basis for sustainable development decision making. Since around 2010, TNC's Conservation by Design framework has been complemented by 'Development by Design,' under which TNC purports to use landscape-level planning to minimize and offset the impacts of energy,

mining, and infrastructure development (Kiesecker et al. 2010; TNC 2017a). 'Green growth' has become the new mantra of the organization. "We can create a new paradigm," writes Justin Adams, a former BP executive who is now TNC's Global Managing Director for Lands, in his preface to TNC's 2015 Global Lands report. The report lays out "a new agenda for green growth" where a doubling of global economic output can "deliver net gains for nature and people" (TNC 2015).

Corporate partnerships are thus not merely convenient or pragmatic, they are indispensable to TNC's mission. "We do not view working with corporations as merely a necessary evil;" Kareiva and Marvier write, "in fact, corporations can be a positive force in conservation" (2012, 967). "TNC's strategy of achieving big conservation results is to work with the entities creating the threats to change their practices," a long-time TNC staff member explained to me, "It is not to vilify or shame. We work with Dow, we work with Monsanto, we work with BP. The world runs on capitalism; that drives everything. How do you make conservation compatible with that?" (TNC49 150811). Mirroring the broader ecological modernization discourse, TNC's answer is that with proper calculation and management, capitalist growth can be green growth: there is a "techno-institutional fix" for the ecological crisis (Hajer 1995, 32).

The adoptions of ecological modernization perspectives, New Conservation Science, and a landscape approach at TNC are closely related to broader shifts in the political economy of the environment and environmental policy discourse. TNC's internationalization and increasing participation in corporate and government partnerships, and its change in focus from wilderness preservation to landscape-scale sustainable development, exemplify the changes that have taken place at other large conservation organizations such as WWF and Conservation International (Chartier and Deléage 1998; Jeanrenaud 1998; Chapin 2004). These organizations have transformed into a group of transnational environmental NGOs (TENGOs) that are closely

networked with intergovernmental organizations, governments, and multi-national corporations across multiple levels and scales in a green growth complex anchored in ecological modernization discourse and promoting neoliberal environmental governance strategies.

Up to this point, this chapter has discussed higher-level discursive and strategic transformations at TNC. As I have argued, however, TNC works through a pragmatic loop where ideology and implementation develop recursively. The emergence of land sparing as the core of TNC's tropical forest conservation strategy illustrates this loop, through which environmental discourse is co-produced with material socio-ecological change.

Land Sparing and REDD in Tropical Forest Conservation at TNC

In Chapter 3, I described the emergence of the land sparing hypothesis through the arguments of figures such as Norman Borlaug and as a part of the broader movement towards synergistic thinking about the relationship between environmental protection and economic development following the 1972 Stockholm Conference. TNC staff have participated in the consolidation of ecological modernization discourse, and they have come to frame their work in forest landscapes in terms of socio-environmental modernization theories such as forest transition theory and the land sparing hypothesis (Hovani 2014; TNC 2015). The adoption of land sparing strategies has not been solely a top-down process, however. TNC projects, while based on specific planning and project concepts, such as eco-regional assessments and REDD, often proceed pragmatically and opportunistically in implementation, and the experience of implementation on the ground reshapes TNC's high-level strategic thinking and discourse. One staff member described this approach as "focused opportunism" (TNC49 150811). "Pragmatism [in policy] comes from knowing what is workable" on the ground, a member of TNC's international climate policy team told me (TNC52 150812).

TNC's experimentation in the late 1990s and 2000s with agricultural policy and REDD pilot projects was shaped by the consolidation of ecological modernization discourse at that time, at the same time as these project experiences re-shaped global discourse. In brief, when REDD emerged as a concept in the 1990s, it was closely linked to neoliberal ideas about environmental markets. REDD projects were expected to produce quantifiable carbon emissions reductions through forest conservation, and those reductions would be commodified as carbon credits sold in markets to compensate the emissions reductions (Sills et al. 2014). TNC, along with numerous other ENGOs and for-profit companies, rushed to launch REDD pilot projects in the late 2000s, and it quickly became apparent that REDD would not play out as neatly in practice as in theory. REDD on the ground faced numerous difficulties, including unclear forest tenure, inadequate monitoring frameworks, concerns about leakage, and the lack of a binding international climate agreement to direct funds to REDD (Sunderlin et al. 2014; Sills et al. 2014; Fishbein and Lee 2015). In coping with these challenges, a number of REDD initiatives, including those directed by TNC, have shifted towards jurisdictional approaches and have reduced or abandoned their expectations of income from carbon credits in favor of broader strategies of 'low emissions development' (Sunderlin et al. 2014; Fishbein and Lee 2015).

As the prospect of a carbon market windfall for forest conservation has faded, land sparing has risen as a strategy for forest conservation and economic development within existing institutional frameworks. Chapters 5 and 6 detail the emergence of land sparing complexes in Indonesia and Brazil and their effects on environmental governance and land use change. In the following sections, I trace the development of land sparing discourse across TNC's tropical forest programs in Brazil, Indonesia, and Mexico and link these programs to the consolidation of land sparing as the cornerstone of TNC's Global Lands strategy. While TNC's tropical forest

conservation programs include numerous activities that are not directly related to land sparing, my intent is to follow the history of land sparing policy discourse within and across these programs, and I argue that in recent years, with the strengthening of TNC's Global Lands Team, the land sparing hypothesis has become the core concept anchoring TNC's tropical forest conservation strategy. I first discuss TNC's field programs and then move upwards to TNC's Worldwide Office, from which field programs were directed and where lessons from the field were distilled to reshape global strategies.

TNC in Brazil: 'Responsible' Agro-Industrial Production and a Jurisdictional Approach

TNC's US strategy focused on private land ownership and acquisition, but as the organization began to work abroad in the 1980s and 1990s, land acquisition was largely unfeasible, and TNC shifted its strategy to focus on working with partner organizations and strengthening regulatory approaches to conservation (TNC44 150715). By the end of the 1990s, TNC was established in Brazil through its work on protected areas management, but TNC staff felt that Brazilian protected areas had become more consolidated, and they wanted to move on to thinking about development pressures, according to a veteran of the Brazil program (TNC43 150713). Soy and beef were clear drivers of large-scale deforestation, so TNC began to seek partnerships with those sectors. Beef was a complicated supply chain with a lower proportion of international exposure, whereas the soy sector was highly concentrated in multinational commodities companies with a substantial reliance on exports to European markets. TNC gained traction more easily with the soy industry and began working with Cargill in 2004. At this time, it was still controversial for a conservation organization to engage with agribusiness, and TNC came under heavy criticism from other ENGOs (TNC43 150713).

In 2003, Cargill had opened a soy port on the Amazon River in Santarém, Pará, which

primarily exported soy grown in Mato Grosso, but also drove the expansion of soy farming in the area around Santarém. TNC began working with Cargill to set up a monitoring system to ensure that its local soy purchases were not driving deforestation, an effort that became TNC's 'Responsible Soy' project (TNC 2017b). The Brazilian Forest Code requires landowners to maintain a portion of their properties as a 'legal reserve' of natural vegetation, as well as to maintain 'permanent protection areas' along waterways and on steep slopes and hilltops. Cargill initially sought to exclude from its supply chain only soy that had been produced on land deforested illegally in violation of the Forest Code. In 2006, however, Greenpeace launched a campaign targeting Cargill for driving deforestation through its soy purchases. In response, Cargill assembled the other major soy traders in collaboration with environmental NGOs to agree to a Soy Moratorium against the purchase or trade of soy produced in areas of the Amazon Biome deforested after 24 July 2006. TNC's existing monitoring efforts with Cargill provided a template for implementing the Soy Moratorium.

By the time the Soy Moratorium came into effect, TNC had already begun applying its 'responsible soy' approach in the São Lourenço river basin in southern Mato Grosso State. The basin-level approach meant that only a small proportion of any given municipality might be registered, and so the project failed to generate much interest on the part of municipal governments and did not meet with great success (TNC19 140502). Aware of TNC's compliance work, the mayor of the municipality of Lucas do Rio Verde in central Mato Grosso, himself the owner of the important regional agricultural trading company Fiagril, approached TNC about developing a municipal-level property registration and compliance project, which was launched in 2006 under the banner of 'Legal Lucas' (*Lucas do Rio Verde Legal*). Working at the municipal level and with a supportive municipal government, TNC had greater success in enrolling producers in its

environmental compliance project and was able to refine its argument that environmental compliance could benefit farmers and improve agricultural production (Ferreira 2010; Rausch 2013). Working at the jurisdictional level was also technically superior to either the property-by-property approach of the Mato Grosso state registration program or the basin-level approach TNC had adopted in the São Lourenço region. Those latter approaches allow for the possibility of overlaps in property boundaries as registrations are frequently entered on the basis of incomplete or inaccurate documentation. A continuous jurisdictional map allowed for TNC to identify overlaps from the outset and call on property owners to resolve them (TNC15 140414).

Legal Lucas thus demonstrated for TNC's Amazon Program the benefits of a municipal-level jurisdictional project design versus a design based on ecological boundaries such as a water catchment.[22] Municipal-level approaches to combating Amazonian deforestation were reinforced in 2008, when the federal government launched a 'List of Priority Municipalities for Actions to Prevent and Control Deforestation in the Amazon' that targeted municipalities with high rates of deforestation for especially rigorous monitoring and enforcement of environmental regulations. At this point TNC had established itself as an organization that could work with agribusiness and producers to help them 'green' their production in the face of environmental pressures. TNC continued to run municipal-level projects supporting environmental compliance in the Amazon, targeting especially those municipalities included in the federal government's priority list. TNC's work with the soy industry and priority municipalities was intimately connected with the rise of a land sparing complex in the Brazilian Amazon, a process that I describe in Chapter 6. In the aftermath of the 2007 Bali Climate Conference, where REDD was included as part of the UNFCCC

[22] This shift from an ecological scale to a politico-administrative scale subsequently occurred at a higher level, as TNC's eco-regional programs in Brazil were combined into a national program in 2015.

negotiations, TNC sought to launch a REDD pilot project in the Brazilian Amazon, and TNC's REDD interventions in Brazil solidified the organization's land sparing discourse.

REDD in the Amazon

When TNC first experimented with REDD through its Noel Kempff project in Bolivia in 1997, the organization had adopted a 'project-level' approach. True to its predilection for land acquisition, TNC purchased four logging concessions adjacent to the Noel Kempff Mercado National Park in the Bolivian Amazon, doubling the size of the park's protected area. While TNC accounted for leakage that might occur through displacement of logging to other areas and sought to offer economic alternatives to local communities in community forestry and park monitoring, the focus of Noel Kempff was on creating a clearly defined protected area, not on managing a working landscape (Hoekstra 2009; Tercek 2009).[23] When TNC returned to REDD in 2008 in Brazil, the organization had a landscape approach and a record of working with government and agribusiness for 'responsible' agricultural production. REDD in the late 2000s was no longer a narrow, technical, market mechanism, but a 'multi-stakeholder' framework that increasingly included non-forest land uses. The jurisdictional approach to REDD was further reinforced by TNC's experience in helping set up the World Bank's Forest Carbon Partnership Facility (FCPF) in 2006-2007, through which funds were designated to support subnational REDD pilot programs (TNC42 150709).

During 2008, TNC conducted a feasibility study in Brazil to identify one or several municipalities for REDD pilot projects in order to develop REDD governance structures and provide the basis for state and national REDD programs (TNC 2008b; TNC54 150814). That

[23] TNC's Guaraqueçaba Project in Brazil's Atlantic Forest, which began in 2000, took a similar 'buy and hold preserves' approach to REDD (TNC 2009; Schapiro 2009).

feasibility study identified Northwest Mato Grosso and the São Félix do Xingu region of Pará as attractive places for establishing REDD pilots. In both regions, in addition to various components for establishing project baselines, monitoring deforestation, and supporting management of indigenous territories, the feasibility study envisaged, "Work with cattle ranchers, governments, and beef industry to increase the level of compliance of [sic] the Brazilian Forest Code by improving monitoring and enforcement to prevent further degradation and deforestation, and by developing and disseminating production systems that are more sustainable and profitable." The strategy for REDD in São Félix additionally proposed to "create an incentive program to engage cattle ranchers on best management practices and intensive cattle ranching" (TNC 2008b). Ranching intensification was thus an important part of TNC's landscape approach to REDD in the Amazon, and drew on connections TNC had been developing with the cattle industry since the early 2000s (TNC12 140409, TNC43 150713).

Activities in Northwest Mato Grosso eventually came to focus on the municipality of Cotriguaçu, and TNC left leadership of the REDD initiative in the region to the Brazilian NGO Instituto Centro de Vida (ICV), which has run the *Cotriguaçu Sempre Verde* (Cotriguaçu Always Green) project in the municipality. TNC trained its focus on São Félix, where it began work in 2009, with activities concentrated on supporting environmental compliance and building institutional frameworks for REDD. In 2013, with the support of a $2.2 million grant from the Moore Foundation, TNC launched a sustainable ranching project in São Félix in partnership with Walmart, the international retailer, and Marfrig, a Brazilian meat processor that sells to Walmart. In addition to supporting ranchers to comply with the Forest Code, the project includes "initiatives to increase ranching productivity through pasture management, in order to guarantee that local ranchers can expand their production without deforesting new areas" (TNC-Brazil 2016). Also in

2013, TNC launched a sustainable cacao project in São Félix with support from Cargill, which seeks to aid smallholders to achieve Forest Code compliance by restoring degraded lands with cacao agroforestry, "combining income improvements with environmental compliance," in the words of TNC's project manager (TNC-Brazil 2013).

TNC's 'second-generation' REDD efforts in the Brazilian Amazon were begun in anticipation of the establishment of a global forest carbon market. As the more radical expectations for forest carbon credits as a driver of ecological modernization faded from the horizon of probability, land sparing became a dominant story line within REDD. One of TNC's Amazon Program staff recounts:

> "Initially our activities in São Félix were a REDD Pilot Project, but now there have been conceptual changes. The expectation of compensatory carbon credits is not going to bring many resources, and Brazil at the federal level does not support credits for REDD. …Our São Félix activities are now 'Sustainable Development' or 'Green Development'… focusing on a logic of sustainable production. We work now more with supply chains than with carbon credits." (TNC 02 131111)

Over the course of the 2000s and 2010s, in sum, TNC in Brazil came to emphasize environmental compliance (which was structured within a land sparing framework) and increasing productivity through agricultural intensification as the core strategies of 'responsible' or 'sustainable' production that would render agricultural development compatible with forest conservation.

The adoption of land sparing discourse and strategies in TNC's Amazon program intersected with the rise of land sparing discourse at the regional and national levels in Brazil. In what Oliveira and Hecht (2016) have described as the 'Amazon Swerve,' reductions in deforestation in the Brazilian Amazon concurrent with increasing agricultural production during the late 2000s were taken as evidence that agricultural production had 'decoupled' from deforestation (Macedo et al. 2012), and so agricultural development could be reconciled with forest conservation. As I describe in Chapter 6, the land sparing hypothesis undergirded most

environmental governance in the Amazon after the promulgation of the federal government's plan for deforestation prevention and control (PPCDAm) in 2004. TNC both created discourses of responsible production, sustainable landscapes, and land sparing through its programs, and drew reinforcement for its land sparing discourse and programs from the other actors and processes in the region.

Deforestation in the Brazilian Amazon declined over 80 percent between 2004 and 2012, as did deforestation in São Félix. Land sparing in the Amazon appeared to be a success, and TNC's São Félix model and Brazil's Amazon model were touted as examples for other tropical forest landscapes (Boucher et al. 2014; TNC 2015). The consolidation and apparent success of land sparing in Brazil influenced TNC's other major tropical forest conservation programs in Indonesia and (later) in Mexico, helping to elevate land sparing within the already eco-pragmatist orientation of these programs.

REDD in Indonesia

TNC began working in Indonesia in the early 1990s, and its Indonesia Terrestrial Program (devoted to forest conservation) was concentrated beginning in 1992 on the protection of Lore Lindu National Park in Sulawesi. Around 2000, the organization began to shift toward Kalimantan, and the East Kalimantan Program was established in 2001, initially with a focus on orangutan conservation and support for sustainable logging (Bennett 2004). Orangutan conservation efforts led to the designation of new protected areas in Berau and Kutai Timur districts, and TNC's work on sustainable logging led to collaborative forest management agreements between logging companies and local communities and a move toward Forest Stewardship Council (FSC) sustainability certification in some Kalimantan logging concessions.

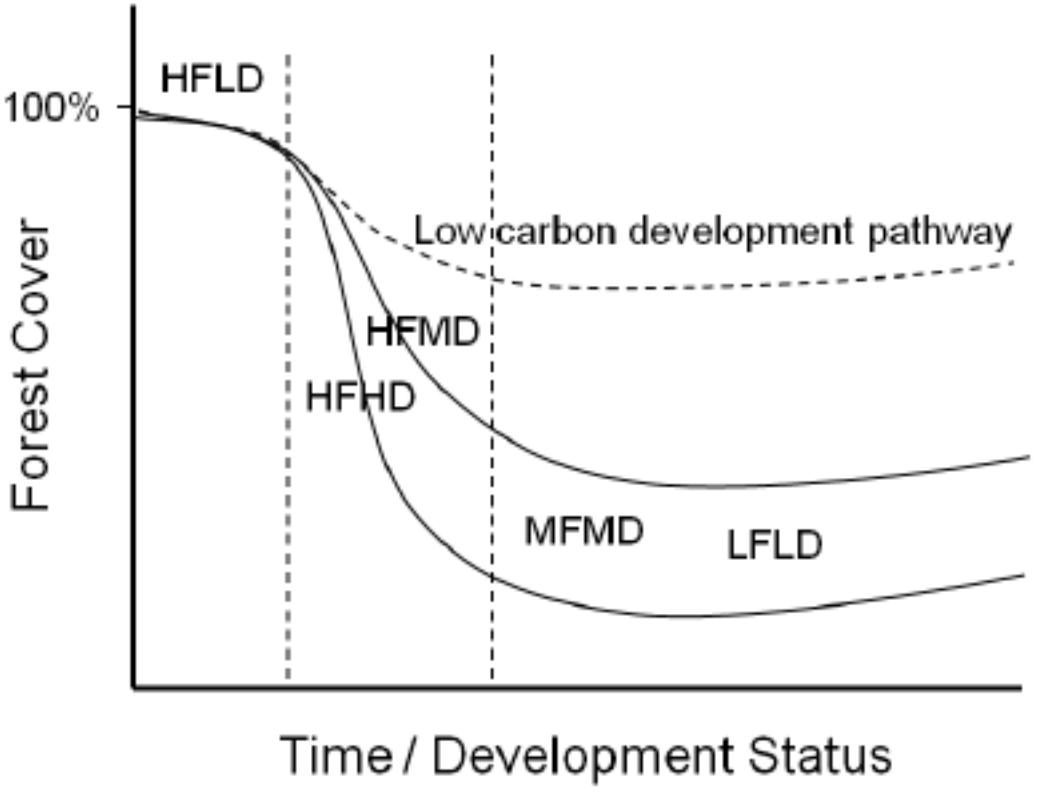
Following the Bali Climate Conference in 2007, TNC sought to launch a REDD pilot

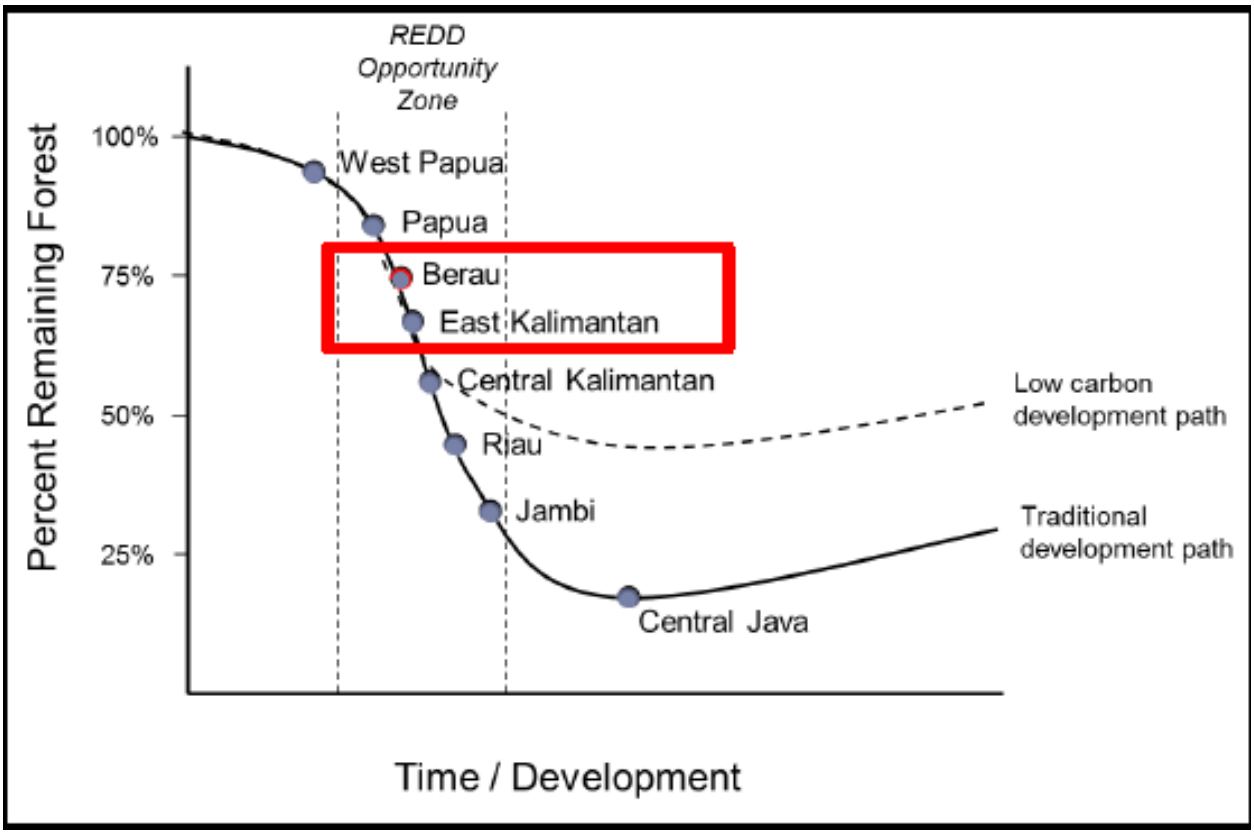
project in Indonesia simultaneously with its REDD initiative in the Amazon. Taking a jurisdictional approach, as in Brazil, TNC began to develop a forest carbon project in Berau District, where the Terrestrial Program had already been active for several years. TNC's work on the Berau Forest Carbon Program (BFCP) was initially devoted primarily to the technical aspects of REDD design and the development of management institutions for the program. As a senior manager of TNC's REDD efforts recalled, "Berau was our first serious effort. …It was more advanced in design for a while [relative to Brazil]. …The concept, design, and visibility were good, but it was hard to move forward. …Brazil started later, but the opportunity around CAR [for environmental compliance] was a big lever to drive change" (TNC50 150813).

Application of land sparing concepts and a direct engagement with agricultural production came relatively late to BFCP. REDD is inherently an ecological modernization concept, since it posits a techno-institutional fix to the environmental problems of deforestation and climate change. Modernization perspectives such as forest transition theory shaped TNC's conception of REDD projects, including in Berau. A 2010 TNC "REDD+ Implementation Framework" draft stated matter-of-factly that "Countries (and states/provinces) are at different points on the forest transition curve… and will need different incentives," and included a schematic forest transition graph plotting forest cover against "Time / Development Status" (TNC 2010), thus embracing a linear modernization narrative. A 2014 presentation of the Berau Forest Carbon Program replicated that graph, this time locating different Indonesian provinces at different points on the forest transition curve, and identifying a "REDD Opportunity Zone" of relatively high forest cover and low "time/development" (Hovani 2014) (Figures 4.1-2).

Green growth discourse was also prominent in East Kalimantan at the time of the Berau program's inception. The province joined the Governors' Climate and Forests Task Force to

support REDD development in 2009. In 2010, East Kalimantan declared itself a 'green province' and launched an Environmentally Sustainable Development Strategy on the premise that "it is possible for East Kalimantan to cut greenhouse gas emissions and still develop" (DNPI Indonesia 2010a). That provincial strategy included sector strategies for palm oil, forestry, agriculture, coal, and oil and gas. Both the palm oil and agriculture sector strategies advocated spatial planning to direct agricultural expansion to degraded lands, and intensification, because "higher yields will help to reduce pressure on forest areas" (DNPI 2011, 81).





Figures 4.1-2: 4.1) Forest transition curve graph from 2010 TNC REDD+ Implementation Framework discussion draft (TNC 2010). Four letter abbreviations describe different country circumstances: HFLD = high forest cover/low deforestation, HFMD = high forest cover/medium deforestation, HFHD = high forest cover/high deforestation, MFMD = medium forest cover/medium deforestation, LFLD = low forest cover/low deforestation; 4.2) forest transition curve graph from 2014 TNC Overview of the Berau Forest Carbon Program presentation showing locations of Indonesian provinces and Berau District on a conceptual curve and identifying a REDD Opportunity Zone (Hovani 2014).

Despite the central role of oil palm plantations and other agricultural expansion to deforestation in Berau, TNC had minimal engagement with these sectors. Land sparing eventually entered TNC's work in Berau through the organization's engagement with community agriculture. TNC began working with 'model villages' in Berau in 2012 as part of its REDD strategy, and in 2013 the organization signed conditional payments agreements with two villages that required the villages to limit their forest clearing for shifting agriculture in exchange for support for alternative livelihoods including rubber production (Thaler and Anandi 2017). The logic of this intervention

is that with rubber groves as a more productive, permanent land use, farmers can increase their incomes while deforesting less land. In 2013, TNC also began managing a US debt-for-nature swap that designated funding to Berau for 'green economic development,' which was specified to include "supporting intensification of production, [and] increasing use of degraded land for economic activities" (TFCA, n.d., 23), and which TNC directed toward replication of its village REDD strategy. In 2015, TNC began to engage the oil palm sector in Berau more directly through the launch of a 'Sustainable Palm Oil' program funded by the German Government, under which TNC hopes to contribute to landscape-level land use planning to reduce deforestation from oil palm expansion by directing new plantations toward degraded lands and away from high conservation value forest (BLI/P3SEKPI 2016; TNC42 150709).

The distinct land use dynamics in Indonesia and the history of TNC's Terrestrial Program led to a more delayed and less prominent adoption of land sparing discourse in TNC's forest conservation activities in that country. While TNC did support 'sustainable commodity' programs in Indonesia, these programs focused initially on the logging industry, which was a more significant driver of forest degradation in Indonesia than in Brazil. As Curran et al. (2004) note, because of the high density of dipterocarp forests in Kalimantan, "intensively logged forests typically have ≥80 percent of the canopy basal area removed or destroyed," and from the 1980s-1990s, the volume of timber exports from Borneo "exceeded all tropical wood exports from tropical Africa and Latin America combined" (1001-1002). Logging was thus a logical priority for TNC's programs, and timber harvesting in natural forests, while amenable to certain ecological modernization approaches such as eco-certification, does not fit easily within a land sparing framework (Griscom and Goodman 2015). Land sparing discourse eventually did shape TNC's village REDD interventions aimed at limiting shifting cultivation and the design of its sustainable

oil palm program for landscape-scale land use planning, but the consolidation of land sparing in TNC's tropical forest conservation strategy has been driven more by the organization's high-level shift to eco-pragmatism, program experiences in Brazil, and the rapid translation of Brazilian land sparing approaches to TNC's REDD program in Mexico.

REDD in Mexico

TNC's reinvestment in REDD in 2008 targeted Brazil and Indonesia as two countries with existing TNC forest conservation programs, large areas of tropical humid forest, and high deforestation rates. The launch of a REDD program in Mexico was an opportunistic decision for TNC. In the words of a senior staff member, "USAID put out a call for a $50 million program in Mexico, and we decided to go up for it" (TNC50 150813). The Mexico REDD+ Alliance (M-REDD+) was formally launched in 2012. Rane Cortez, who directed TNC's international climate policy efforts on REDD, had been seconded to Brazil in 2010-2011 to assist in setting up the São Félix REDD project, and now became the director of M-REDD+. In Mexico, TNC has experimented with REDD at new jurisdictional levels, working across three contiguous states in the Yucatán Peninsula, and within the states adopting an 'inter-municipal approach' that combines several of Mexico's relatively small municipalities into a group for the purpose of program interventions (TNC56 151205).

Cattle ranching is one of the dominant rural land uses in the Yucatán, and the approach adopted in M-REDD+ echoes the Brazilian land sparing model. TNC has carried out 'sustainable intensification zoning' and directed financing toward ranching intensification. In a panel during a side event to the Paris Climate Conference in December 2015, Carlos Rafael Muñoz, Secretary of Ecology and Environment of Quintana Roo State, one of the M-REDD+ participants, was explicit: "Intensification is the priority we want the government to support;" he asserted, "we want to

overcome poverty by making production more efficient." When asked by a participant whether reducing meat consumption could be an option for alleviating deforestation pressure, Muñoz was dismissive: "Eating meat is a part of our culture," he admonished. "We're not going to reduce the amount of meat we consume; we're going to make production more efficient, to occupy less space and produce more." This land sparing vision is equally clear in program literature, which states that "the Alliance works with the Mexican government, organized civil society, and local communities to reduce deforestation and forest degradation through the promotion of sustainable farming, ranching and forestry practices. With these practices, we hope to mitigate climate change and help communities increase their incomes through more efficient use of their land and their forests" (Mexico REDD+ Alliance, n.d.).

Drawing on TNC's REDD experiences in Brazil and Indonesia, and particularly the land use planning and ranching intensification strategies that TNC had developed in Brazil, M-REDD+ comprises a clear articulation and application of land sparing as a mechanism for forest conservation. In this regard, M-REDD+ both responds to and reinforces the increasing clarity and consolidation of land sparing discourse at TNC at the global level.

Figure 4.3: The Nature Conservancy worldwide. Clockwise from upper left: Worldwide Office (headquarters) in Arlington, Virginia, USA; district office in Tanjung Redeb, Berau, Indonesia; house used by TNC staff in Long Duhung village, Berau, Indonesia; Amazon Program head office in Belém, Pará, Brazil.

Land Sparing and TNC's Global Teams

During the 1990s and 2000s, TNC's Amazon Program in Brazil and Terrestrial Program in Indonesia developed with a fairly high level of autonomy from TNC headquarters. Program directors for the most part were American or other Anglophone men with backgrounds in environmental conservation, while field staff were generally hired locally. TNC's global planning tools, such as eco-regional assessments, were applied across the international programs, but projects were generally developed at the technical level within the programs themselves, with

headquarters taking a lead in marketing and fundraising (TNC41 150711). In 2008, Mark Tercek left his job as managing director of the Environmental Markets Group at Goldman Sachs investment bank to become president of TNC. Months later, the global financial crisis struck, and TNC found itself overextended in its international programs. In an effort to give a more strategic overlay to the organization, TNC formed 'global teams' at the Worldwide Office to respond to what the organization had identified as 'global challenges' (TNC 2017c). The global teams for Lands, Water, Oceans, and Cities are today headed by 'global managing directors' who are members of TNC's Executive Team. Global Lands "historically was what TNC had been working on everywhere," as a senior manager told me (TNC44 150730). The Lands team identified four key themes and hired small teams to work on them. Those themes were Smart Infrastructure, Indigenous Peoples, Sustainable Agriculture, and Forests and Climate. The goal was for these teams to work with the field programs to provide expertise and advice, to represent the theme to donors, and to become knowledge centers for the organization (TNC44 150730).

The creation of the Forests and Climate Team occurred at the same time as TNC was investing in a new generation of REDD projects following the Bali Climate Conference. Greg Fishbein, a Wharton MBA and former management consultant who was the head of TNC's Business Consulting Group, was selected to lead the team. The Forests and Climate Team's role was to provide strategic direction to TNC's REDD programs in Brazil and Indonesia, to promote and fundraise for TNC's REDD efforts, and to function as a center of expertise on REDD issues. In the words of one of the team members:

> "The Forests and Climate global team's contribution to the field is a strategic vision of how to do the work. The field programs were previously more project based and small scale, working in parks and the like. When REDD emerges, we're in a position at the global level to see this is where the future is going. This is what people want to see, what funders want to fund. …The global team went out to help build programs. We bring a strategic vision and expertise on how to design

> programs, providing technical support for carbon accounting, science, and community issues like how to engage communities and measure benefits. And we bring expertise on finance. Most money for the jurisdictional REDD projects comes from Forests and Climate fundraising in collaboration with country teams. …Seconding people from the global team has been valuable in bringing skills to the local team and creating strong connections." (TNC50 150813)

The Forests and Climate Team under Fishbein was a hub of ecological modernization thinking driving TNC's tropical forest conservation efforts. A common refrain among Forests and Climate and Global Lands staff is the importance of creating a "compelling value proposition" for a "forest-friendly development model" (Fishbein and Lee 2015, 3; also TNC 2015, 16).

Complementing the hub-and-spokes relations of the field programs with the Forests and Climate Team, TNC has organized roughly annual REDD Exchanges – conferences that bring together TNC staff working on REDD from across the organization. I attended the fourth of TNC's REDD Exchanges, which took place in Jakarta in November 2014. The two-day "Jurisdictional Approaches to Green Development Learning Exchange," which was followed by a two-day field trip to Berau for TNC employees, was attended by staff from the Brazil, Mexico, and Indonesia programs, and primarily US-based members of the Forests and Climate Team, International Climate Policy Team, Development by Design Team, and Global Lands directorate, as well as two of TNC's carbon scientists. Also invited were a number of TNC partners from research institutes, NGOs, funding agencies, and the Indonesian Government. These events serve as moments of exchange of ideas and calibration of discourse across TNC's tropical forest programs and partnerships. Land sparing at this event was common sense: a necessary and effective strategy for green development. In his opening address to the gathering, Greg Fishbein, director of the Forests and Climate Team, began by showing two images "that remind me why we work on this issue of saving the world's forests." The first was the 'blue marble' photograph of the Earth from space, and the second was a satellite image of São Félix do Xingu. The growing demand for food, fiber,

and energy will add stress to the planet, Fishbein asserted; "It can be discouraging, but there are clear solutions: increase productivity, log more efficiently, and use degraded lands." Brazil, and São Félix, were the example to be followed: "What can we learn from success in Brazil, and how can we make palm oil more efficient?" Fishbein asked the audience. In a plenary session the next day on "Jurisdictional Approaches to Sustainable Commodity Production," participants agreed that Brazil's land sparing approach of intensification and frontier governance offered a model for countries like Indonesia to reduce deforestation. "Indonesia is in exactly the same place Brazil was in the early 2000s," asserted Frances Seymour, former Director-General of CIFOR and now a fellow at the Center for Global Development and advisor to the Packard Foundation, "it has a new president, the highest deforestation in the world, and new monitoring capabilities." By implication, Indonesia could replicate Brazil's 'success' and "transform the development paradigm" (Fishbein and Lee 2015, 4) to productivist, 'low emissions development.'

Finally, the Sustainable Agriculture component of TNC's Global Lands Team is also deeply connected to the Amazonian land sparing strategy. In 2010, David Cleary, the former director of TNC's Amazon Program, who was instrumental to TNC's work with agribusiness in Brazil, became TNC's global Director for Agriculture, from where he has helped to place 'sustainable intensification' at the core of TNC's sustainable agriculture concept. In addition to transferring land sparing approaches, from Brazil to Indonesia and Mexico, for example, TNC is seeking to scale up its land sparing models, for instance by adopting a supply chain approach to transform TNC's experience with ranching intensification in Brazil and Mexico into a 'Latin America cattle strategy' (TNC50 150813).

Global Lands

Since 2014, TNC's Global Lands Team has become more integrated and holistic under the

direction of Justin Adams, the managing director for Lands and a former BP executive. The Forests and Climate Team no longer exists. Climate issues have been 'mainstreamed' across programs, and while there is still a Forests unit within the Global Lands Team, 'working landscapes' has become the unifying concept for the program (TNC43 150713). Greg Fishbein is now in charge of 'Landscapes Finance,' while another former Forests and Climate Team member has become the lead for 'Integrated Landscapes Strategies.' "Forest is still the big kahuna" within Global Lands, one of the team members assured me (TNC50 150813), and intensification is still at the core of TNC's strategy for reconciling production and conservation in working landscapes.

In 2015, the Global Lands Team published *Lands can do more: An integrated approach to conservation and development* (TNC 2015), which a team member described as a "first attempt to put something into writing" expressing the new Global Lands perspective at TNC (TNC58 151205). *Lands can do more* is an apotheosis of eco-pragmatism, and clearly demonstrates the centrality of land sparing to current forest conservation at TNC. Much can be said about this document and what it reveals about TNC's policy discourse and policy making. The title, "Lands can do more," indicates a productivist attitude toward land, while the subtitle unabashedly evokes 'integrated conservation and development project' (ICDP) approaches that were popular before the advent of REDD and have been criticized for failing to meet conservation or development objectives (Sunderlin et al. 2014). Nonetheless, conservation and development is precisely what TNC's eco-modernist vision promises. The picture on the front and back covers of the report, meanwhile, is of a cowboy herding cattle in the Brazilian Amazon, reinforcing the centrality of TNC's Amazon experience to its global lands strategy. The report takes as a truism "the need to double production of food, fiber and fuel by mid-century" (6), sets up a dichotomy between "natural land" and "working land" (8), and then claims that "Encouraging more productive

activities on these [working] lands is the only way we can meet growing demand for food, fiber and fuel while also taking pressure off habitat conversion" (14). Land sparing through agricultural intensification and forest protection is TNC's solution (29), and the tropical forest programs in Pará and East Kalimantan are profiled as models, alongside other TNC programs in North America, Mongolia, and Kenya. "We can be a model," a São Félix rancher is quoted as saying, "not just for Brazil, but for the world" (42). A productivist, eco-modernist strategy of land sparing through agricultural intensification and forest protection has thus become not only the core of TNC's forest conservation programs, but a pillar of the "innovative approaches to protection and production" that TNC promotes as "the heart of a new agenda for green growth" (14).

Conclusion

This chapter has followed the rise of ecological modernization and land sparing discourse at TNC in order to provide a history of ideas and history of practice that links discursive change with the political-economic and ecological transformations of tropical forest landscapes that are described in depth in Chapters 5 and 6. Between the 1970s and 2000s, TNC transformed from an organization focused on land acquisitions and protected areas approaches to biodiversity conservation in the United States to a transnational organization espousing global green growth in working landscapes. In TNC's work on tropical forest conservation, the Amazon Program in Brazil pioneered work on 'responsible' agro-industrial production and subnational jurisdictional project models. When TNC invested in second-generation REDD projects in Brazil and Indonesia beginning in 2008, the Amazon Program gained recognition for major deforestation reductions in São Félix do Xingu. TNC helped engineer these reductions as a member of a land sparing coalition in the municipality, participating in Brazil's Amazonian land sparing model of territorial constriction through protected areas creation and Forest Code enforcement combined with

agricultural intensification on private lands. The prospect of a global market for forest carbon credits faded in the 2010s, land sparing policies in Brazil had produced deforestation reductions that provided TNC with a model of success, and partnering with industrial agribusiness allowed TNC to attract new funds and operate at larger spatial scales, so TNC pragmatically embraced land sparing as the core of its tropical forest conservation strategy. TNC's tropical forest programs include components not directly associated with land sparing, such as support for indigenous peoples to manage their territories, but the central political-economic premises of TNC's strategy are that socio-economic development is necessary; therefore production of food, fuel and fiber must increase; and the only way that development and increasing production are compatible with environmental protection is through land use planning, agricultural intensification, and environmental governance.

Contemporary discourse and practice at TNC highlight several key tendencies in ecological modernization discourse and the neoliberalization of environmental governance. First, ecological modernization holds that synergy is possible between capitalist development and environmental protection, in the form of 'sustainable development' or 'green growth,' but these synergies require planning and design. Ecological crisis is thus transformed into a technical problem, for which TNC develops metrics and planning tools that are touted as 'science-based,' thus positioning science as a regulatory project. These metrics and planning tools are all premised on the 'pragmatic' inevitability of certain forms of development. New Conservation Science thus emerges as an ideological and regulatory project supporting capitalist (green) development. In praxis, green growth requires taking into account both 'natural' and 'working' lands, so it necessitates a 'landscape approach.' Project-based interventions such as REDD at Noel Kempff encounter problems of leakage and ownership, so interventions move to a jurisdictional scale. There is an

implication in TNC's approach that traditional conservation did not achieve satisfactory results because it was not working at large enough scales, but when scale is finally achieved, environment and development will harmonize. A similar logic sees accelerating deforestation in Indonesia concurrent with declining deforestation in Brazil as an indication that Brazil offers a model that should be replicated in Indonesia. These ecological modernization and land sparing logics see displacement of degradation as a technical and temporary problem, not as a fundamental dynamic of capitalist development.

The 'solution' offered by land sparing is both scientifically and logically dubious, yet it is made to appear as the only and inevitable course of action. I have addressed scientific problems with land sparing in Chapter 3, where I argued that land sparing ignores the integral dependence of productivism on extraction. Land sparing discourse at TNC is also logically contradictory: eco-pragmatism condemns a focus on protected areas or ideas of 'pristine' nature, yet simultaneously advocates intensification as a way to spare more land *for* 'nature.' Discourses are often contradictory, however; the coherence of land sparing lies in its support for intensification and productivism within a narrative of capitalist modernization. TNC applies this narrative at multiple spatial levels from villages in Berau to municipalities in Brazil to regions in Mexico to the globe. Discourses define and limit legitimate and credible policy and action. Land sparing and ecological modernization come to appear as necessary and inevitable processes to the degree that land sparing and ecological modernization discourse become hegemonic, delegitimating and rendering invisible critiques and alternatives. Multiple concepts and story lines support and legitimate discourse hegemony, as for example forest transition theory and the conflation of 'time' and 'development' have become naturalized facts underlying the conservation thinking of TNC staff. Teleology is a bulwark of hegemony, and it hides the contested and contingent processes through

which land sparing, and ecological modernization more broadly, have come to dominate discourse and policy making as components of an ascendant 'green neoliberalism' (Goldman 2005; Hajer 1995).

Simplistic modernization narratives are belied by TNC's own program experiences, however. Deforestation reductions in the Brazilian Amazon were achieved through the actions of land sparing coalitions of government, corporate, and NGO actors that have sought to engineer a shift in the regional political economic regime from extraction to productivism. Through the actions of these land sparing coalitions, farmers and ranchers have been pressured to shift from extensification to intensification. TNC provides the techno-institutional tools to make this shift. Where development has an environmental problem, TNC offers a solution, but TNC does not set out to create problems for development. Under an extractive regime such as in Indonesia, this "non-confrontational, pragmatic" (TNC 2016b) approach gains little traction, because the actors driving extractive deforestation are empowered by the prevailing political-economic regime and do not feel sufficient pressure to change their practices. Berau has been a focus of TNC's Indonesia Terrestrial Program since the mid-2000s, and TNC has invested heavily in Berau as a REDD pilot project, but despite over 10 years of TNC engagement, and some patchwork achievements, deforestation in Berau has not declined. A TNC staff member notes that the Berau REDD program was for a time more advanced in design than the Amazon program, and TNC was successful in its fundraising for Berau, "but Indonesia is a frickin' difficult place to work. The concept, design, and visibility were good, but it was hard to move forward." In Brazil, meanwhile, Forest Code compliance was "a big lever to drive change," and deforestation has declined dramatically (TNC50 150813).

TNC's differential success in Indonesia and Brazil is, I argue, not really TNC's 'fault.' Problematizing is a prerequisite to 'rendering technical' (Li 2007b) and producing pragmatic solutions. In Brazil, the government has joined with environmental NGOs to limit Amazonian deforestation and major corporations have proved sensitive to government and activist pressures, creating an opening for TNC to work with agricultural producers and corporations to comply with government regulations and deforestation moratoria. Indonesia, by contrast, remains in the thrall of an extractive regime that exploits natural resources with little regard for local development or environmental consequences. Domestic environmental activism is repressed, and the government is complicit with corporations in deflecting pressures from international activists. Absent the problematization of the major drivers of deforestation, TNC is left spinning its wheels. TNC's failure to reduce deforestation in East Kalimantan reflects the conditions of possibility for ecological modernization to occur. While an extractive regime prevails, the Indonesian government and plantation and mining companies have a greater interest in extractive deforestation than in productivist investment, and TNC's work will have little effect on regional deforestation. In the next Chapter, I describe forest governance and land use change in East Kalimantan, Indonesia. Deforestation in Indonesia illustrates the baseline dynamics of extraction typical of tropical forest frontiers. I show how land sparing and forest conservation efforts in Indonesia have been hindered by the operation of an extractive political-economic regime. I then proceed in Chapter 6 to describe how a land sparing complex in Brazil has reduced Amazonian deforestation as part of an effort to engineer a shift from extraction to productivism. Chapter 7 completes the argument by demonstrating that productivism requires extraction, land sparing is a fallacy, and ecological modernization at the global level is not possible.

CHAPTER 5

INDONESIA: EXTRACTION

> "Indonesia's rates of deforestation, dewilding of forests and seas, and also its recent spate of fires, clearly show that nothing is under control, and that, in fact, everything in conservation is utterly out of control. … [T]he protected areas, conservation laws, and those that are supposed to enforce them are largely ineffective. … We don't need more laws, new laws, or changed laws, if the old ones never worked because no one bothered, or felt entitled or empowered to enforce them. We need a new system … Why are laws ignored. Is it corruption within the government? Financial interests within or outside the government that overrule the laws? A total disinterest among government and public in environmental conservation? Or all of them?"
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> - *Erik Meijaard, former Senior Scientist and Terrestrial Program Director of TNC-Indonesia, Coordinator of the Borneo Futures Initiative,* Jakarta Globe, *10 November 2015*

In Indonesia, as in much of the tropics, forest conservation policies have been largely ineffective in constraining deforestation since the 1970s. Protected areas have been 'paper parks,' and new land sparing and other green growth initiatives have failed to check accelerating deforestation during the 2000s. I argue that conservation policies have been ineffective in restraining deforestation in Indonesia and many other tropical regions because these regions fall under extractive political-economic regimes.

Indonesia is ruled by an extractive regime that stabilizes a peripheral, extractive economy that removes value from the country in the form of natural resources and embodied labor, to support accumulation in productivist centers abroad. This national-level extractive regime facilitates unsustainable logging and plantation and mining expansion and stymies the efforts of a land sparing complex of international actors and their domestic allies to promote land use intensification and reduce deforestation. Logging and fires contribute to forest degradation, while industrial oil palm, wood fiber plantations, and other agricultural activities including small-scale agriculture, expand over both degraded and intact forest area (Abood et al. 2015; Griscom et al.

2016; Gaveau et al. 2016). Environmentalist groups campaigned against timber extraction in Borneo during the 1980s and 1990s, particularly in the Malaysian state of Sarawak, and the development of FSC certification at this time within a 'sustainable timber' complex was a key moment in the emergence of ecological modernization discourse in the tropics (Brosius 1999). As oil palm expansion in Kalimantan accelerated during the 1990s and 2000s, environmental NGOs began to focus increasingly on the relationship between deforestation and agricultural production.

Plantation monocultures in Kalimantan are often characterized by low quality inputs and poor land use planning, and they expand predominantly through conversion of forests or peatlands (Carlson, Curran, Asner, et al. 2012) to avoid tenure conflicts and profit from timber sales. Local populations are usually marginalized or adversely incorporated (Hickey and Toit 2007; John McCarthy 2010; Li 2015). Ecological modernization discourse has dominated environmentalist policy making efforts targeting plantations, leading to governance initiatives such as the multi-stakeholder Roundtable on Sustainable Palm Oil (RSPO), formally established in 2004, and numerous REDD programs following the UNFCCC Conference of Parties in Bali, Indonesia in 2007. Two principal strategies have emerged for reducing deforestation from oil palm expansion. The first strategy is to shift the siting and development of plantations so that forest areas are spared from conversion. This strategy has led to provisions in RSPO guidelines against conversion of primary or high conservation value forest, and efforts to engineer 'land swaps' or otherwise direct oil palm expansion away from forested areas and towards 'degraded lands' (Gingold et al. 2012; Rosenbarger et al. 2013). The second strategy is to intensify or improve the efficiency of oil palm production in order to raise productivity and close 'yield gaps' (van Noordwijk, Khasanah, and Dewi 2017; Soliman et al. 2016; Woittiez et al. 2017). The latter strategy of increasing productivity employs an archetypical logic of land sparing via agricultural intensification, but the former

strategy of improved land use planning is also a strategy for land sparing via land use intensification. The premise of land use planning and optimization is that maximizing the productive use of deforested lands will allow for increasing production without deforestation, a corollary of the decoupling logic of land sparing via agricultural intensification. In both cases, industrial agriculture and environmental protection are held to be compatible, so long as economic production is effectively controlled and managed.

These land sparing projects have so far failed to transform the extractive economy and the regime that supports it. Political-economic regimes are sticky institutional formations, and the Indonesian regime is especially expansive and enduring. The extractive regime in Indonesia has its roots in the Dutch colonial period, and has persisted through the Suharto dictatorship and post-Suharto democratization. The national regime is reproduced at the provincial and district levels in my case study areas of East Kutai and Berau Districts in East Kalimantan Province of eastern Indonesian Borneo. East Kalimantan would appear to be a best case for forest conservation in Indonesia. It has substantial remaining forest cover; a long history of involvement with environmentalist NGOs (including TNC-Indonesia's Terrestrial Program), research groups, and bilateral cooperation programs; and a government that has committed itself to green growth. Although a coalition of actors promotes green growth and land sparing policies in the province, plantations and mining have continued to expand, and deforestation has increased substantially over the past decade.

TNC launched its program in East Kalimantan in 2001 with a focus on Berau, due to the district's extensive lowland forest areas and orangutan population, and the "relative lack of ethnic strife" in the province (Bennett et al. 2004, 2). In 2002-2003, TNC implemented the cornerstone of its 'Conservation by Design' process by conducting an eco-regional assessment for East

Kalimantan. On the basis of this assessment, the East Kalimantan Program identified four priority sites for conservation, primarily in Berau and neighboring East Kutai District, and a number of 'leverage sites' where TNC would encourage conservation by local government and partners with limited direct involvement (Bennett et al. 2004). TNC has subsequently been involved in conservation efforts in East Kutai and Berau for over a decade, but its programs in the two districts have taken very different directions. Furthermore, while East Kutai and Berau share certain ecological characteristics, including intact upland forest areas along their western borders and the limestone karst landscape of the Sangkulirang peninsula, East Kutai is closer to the provincial development hubs of Bontang, Samarinda (the capital), and Balikpapan, and suffered more substantial damage from Indonesia's severe El Niño fire events during the 1980s and 1990s (Siegert and Hoffmann 2000; Dennis and Colfer 2006).

East Kutai today presents a picture of almost complete landscape conversion under an extractive regime. Coal mining and oil palm and wood fiber plantations have replaced forests on a massive scale, and even Kutai National Park has been logged, burned, encroached upon, and reduced. There is virtually no coalition for land sparing in the district, and an overwhelming impetus for extractive expansion. TNC's most notorious activity in East Kutai is the protection of an area of orangutan habitat in cooperation with a local indigenous group known as the Wehea Dayak, in the northwestern area of Muara Wahau-Kongbeng. Despite the severe environmental degradation of the East Kutai landscape, TNC's project with the Wehea Dayak is widely cited as a success story by TNC and the East Kutai government, and Muara Wahau-Kongbeng is, somewhat paradoxically, both a center of oil palm expansion and a center of environmental conservation initiatives. This juxtaposition demonstrates how 'forest' and 'indigeneity' are

reconstructed as residual categories in the extractive landscape (cf. Li 2000), albeit with their own possibilities for commodification.

Berau District, East Kutai's neighbor to the north, contains some of the largest remaining areas of lowland forest in Kalimantan and is the site of a major TNC REDD project. Nonetheless, the land sparing coalition in Berau is weak, and deforestation has accelerated in spite of multiple conservation programs. While TNC has begun to devote some efforts to oil palm sustainability, primarily within a frame of land sparing via land use intensification, no coalition has managed to integrate district government and corporate actors to effectively limit plantation and mining expansion in Berau. Unable to oppose the extractive economy, environmentalist actors have developed a land sparing coalition focused on the control of swidden agriculture (i.e., shifting cultivation with fire) as a strategy for limiting deforestation and promoting economic development. Industrial clearing dwarfs forest conversion in swidden systems and undermines the conservation gains of swidden-limiting forest governance, however. The failure to reduce deforestation in this best-case district in a best-case province demonstrates the power of political-economic regimes in determining patterns of land change and economic development, and the conditioning effect of higher level regimes on lower level transformative projects.

This chapter proceeds by describing the development of Indonesia's extractive regime under Dutch colonialism and the Suharto dictatorship and post-Suharto period. I introduce the political economy and environmental politics of East Kalimantan province, and then develop my case studies of East Kutai and Berau Districts. The chapter concludes with a comparative analysis of East Kutai and Berau and reflections on the structure and political ecological implications of Indonesia's extractive regime.

The Extractive Regime in Indonesia: From Colony to *Reformasi*

The Dutch East India Company was created in 1602 to control the spice trade in the Indonesian archipelago. The Dutch expanded their economic and territorial control in the region during the 17th and 18th centuries (albeit with numerous conflicts and setbacks), until the Company was dissolved in 1800 and the Dutch crown took control of its territories. After the Java War of 1825-1830, Dutch rule over the island of Java was consolidated, and the Dutch intensified their extraction from the colony through the imposition of the infamous 'Cultivation System' (*Cultuurstelsel*), which required villages to set aside a fifth of their land for the production of cash crops such as coffee, sugar, and indigo. The Cultivation System exploited domestic labor and undermined subsistence production while delivering enormous profits to the Dutch and local elites (Ricklefs 2008). With the Agrarian Law of 1870, the Dutch moved to a model of exploitation through private plantations. The 'Domain Declaration' (*Domeinverklaring*) that accompanied the law appropriated all land not under clear ownership to the colonial state and served as a pretext for the expropriation of forests and fallow lands for plantation companies (Stoler 1995). Plantation development was concentrated in Java and Sumatra, while in Borneo the Dutch sought to secure control over coal mining and oil extraction (Lindblad 1988; Singer 2009), but were more limited in their control over interior forest areas (Peluso and Vandergeest 2001). While the profitability of the Dutch East Indies to the Netherlands rose and fell, especially with fluctuations in global commodity markets and military expenditures, the fundamental logic of the Dutch colonial government of Indonesia was the extraction of profit for the metropolitan state and capital (Ricklefs 2008; Mansvelt 2012).

As Acemoglu, Johnson, and Robinson (2001) have argued in general terms, the extractive institutions of the colonial state created a political economic order that in many cases persisted after independence. They quote Crawford Young (1994) to assert that post-colonial states "were

successors to the colonial regime, inheriting its structures, its quotidian routines and practices, and its more hidden normative theories of governance" (Young 1994, 283 quoted in Acemoglu, Johnson, and Robinson 2001, 1376). While institutionalist approaches often pathologize (and dehistoricize) patterns of natural resource degradation in the post-colonial states of the Global South as the effect of 'weak governance,' William Ascher notes that 'lack of capacity' may not be unintentional: resource degradation in these countries is often driven systematically by institutions and political projects geared toward "financing controversial development programs; providing economic benefits for particular groups, areas, or individuals; or capturing natural resource rents (or other sources of revenue) for the central treasury" (Ascher 2000, 12).

Following the interlude of a more nationalist economic policy under President Sukarno after Indonesian independence in 1945, the extractive regime in Indonesia was fully reasserted with the ascendance of General Suharto and his displacement of Sukarno as president in 1967. Suharto's 'New Order' regime mirrored the colonial state in its endemic corruption and cronyism, support for large-scale agricultural plantations at the expense of smallholders, and appropriation of land and resources through the dispossession of local populations. The political economy of New Order Indonesia was structured around the extraction of multiple resource commodities to fuel regional circuits of capitalist accumulation centered on Japan and global circuits centered on the Euro-American core (Dauvergne 1997; Gellert 2010).

The tropical timber trade was one of the pillars of the Suharto regime, particularly after Suharto bankrupted Pertamina, the state-owned oil company, in the 1970s by using it as a source of off-budget funding for development projects (Ascher 2000). The 1967 Basic Forestry Law, enacted shortly after Suharto's rise to power, had arrogated to the central government's Forestry

Department[24] control of the national 'forest estate' (*kawasan hutan*), covering over two-thirds of Indonesian territory, in a direct reprisal of the colonial Agrarian Law of 1870 (Rhee 2006). At the same time, the logging industry was opened to foreign investment. Rapid expansion of industrial-scale logging took place in Kalimantan from the 1970s onward.

The general pattern of timber extraction involved, first, the allocation of logging concessions to Suharto's military allies and business cronies and their foreign partners (Ross 2001). As Barr recounts, "Partnerships with the largest [foreign] investors were almost always forged by military interests, politico-bureaucratic powerholders, or private entrepreneurs with close ties to elite officials. In particular, military-owned holding companies, cooperative enterprises, foundations, and pension funds, representing the particular interests of both individual officers and whole commands, frequently acted as 'silent partners' for foreign logging companies" (1998, 6). The deep involvement of the military in Indonesia's timber sector helped insure loyalty to the regime (through personal enrichment), facilitated the repression of any local dissent to logging operations, and guaranteed impunity for violations of harvest limits and other regulations (Barber and Talbott 2003). An emblematic example of the alliances between foreign capital and domestic elites for the extraction of Indonesian timber was the partnership between Georgia Pacific, an American timber multinational, and Bob Hasan, Suharto's long-time business partner. Hasan and Georgia Pacific were awarded a 350,000 ha concession in present day East Kutai, from which Georgia Pacific exported over 2.2 million m^3 of raw logs during its first decade of operation, with gross earnings valued at over $460 million in 2017 dollars (Barr 1998, 7).

[24] The Directorate General of Forestry was made a Ministry in 1964, downgraded to a Directorate in 1967, and restored to ministerial status in 1983. In late 2014, the Ministry of Forestry merged with the Ministry of Environment to form the new Ministry of Environment and Forestry.

Second, in the early 1980s Indonesia banned the export of raw logs, and Bob Hasan helped lead an expansion of the country's wood processing sector that transformed Indonesia into the world's largest hardwood plywood exporter (Barr 1998). Plywood, sawn wood, and pulp and paper mills proliferated in the 1980s and 1990s without effective supervision or the guarantee of sustainable timber supplies, leading to overcapacity in the wood processing sector and a timber supply deficit that by 2005-2006 had reached 40 million m^3 annually (Obidzinski, Andrianto, and Wijaya 2007). Third, this timber supply deficit and the generalized corrupt and extractive character of the timber sector have driven what Obidzinski et al. characterize as "massive over-harvesting" and the "spiralling deterioration of Indonesia's forest resources" (2007, 532). Fourth, for a coup de grâce, in 1989 the Suharto government created a Reforestation Fund (*Dana Reboisasi*) ostensibly intended to support reforestation and rehabilitation of degraded lands. The Reforestation Fund was supplied by a volume-based levy on timber concessionaires and was the largest single source of government revenues from the commercial forestry sector. The Ministry of Forestry used the fund to support the development of industrial tree plantations, predominantly on forested land and by companies with close ties to political elites that engaged in fraudulent practices to maximize their rents from the fund and from the exploitation of forest areas. The fund was also used by the regime to finance unrelated, off-budget development projects, such as a $190 million transfer to the state aircraft company and a $109 million allocation to Bob Hasan's PT Kiani Kertas to finance construction of the company's pulp mill in Berau. A 1999 audit by Ernst & Young documented losses of $5.2 billion from the Reforestation Fund in the five years from 1993-1998 due to mismanagement, fraud, and improper diversions of funds (Barr et al. 2010).

The fall of the Suharto dictatorship in 1998 in the gyre of the Asian Financial Crisis ushered in the period of 'Reform' (*Reformasi*) in Indonesia, but the essentially extractive character of the

political economic regime has persisted in the post-Suharto period (Hadiz and Robison 2005). In the forestry sector, the Ministry of Forestry has continued to exercise virtually unchecked control over the lands of the forest estate, although decentralization measures prompted a surge in smaller-scale concessions issued by district governments, which exacerbated illegal logging and forest clearing and were quickly reined in by the central government (Obidzinski and Barr 2003; Barr et al. 2006). Illegal log production, generally from exceeding harvest limits or cutting outside of forest concessions, was often double or triple official production in the early 2000s (Obidzinski, Andrianto, and Wijaya 2007), and while expansion of tree plantations may have supplanted some illegal production, estimates in 2010 and 2013 suggest that 40-60 percent of Indonesian timber is still cut illegally (Hoare and Wellesley 2014). An analysis by Smajgl et al. (2008) for East Kalimantan found that industrial logging did not reduce poverty in the province, rather "a *reduction* of annual allowable cut of existing HPH [industrial] concessions are more likely to reduce poverty as logging allows a minority of the population to benefit while a majority faces lower income due to negative externalities from logging" (17, my emphasis). Social and ecological degradation have been corollaries of extraction in Indonesia from the Dutch colonial period to the present.

While I have focused here on describing the functioning of the extractive regime in relation to the timber sector, the acceleration in deforestation in the post-Suharto period has also been driven substantially by the conversion of forests to industrial oil palm plantations. The oil palm sector in Indonesia has developed through similar circuits of corruption, cronyism, illegality, and environmental degradation linked to accumulation by domestic elites and foreign capital (Greenpeace 2007; Obidzinski et al. 2012; Setiawan et al. 2016; Purnomo et al. 2017), as have the

other major natural resource and agricultural export sectors of the Indonesian economy, such as oil and gas, mining, and fisheries (Gellert 2010).

Forest Conservation under the Extractive Regime

Deforestation under the extractive regime in Indonesia has not proceeded in the complete absence of opposition or some impulse for forest conservation. The creation of forest reserve areas was used by the Dutch, as by other colonial regimes (Grove 1995), as part of a strategy for constructing control and management of territory, populations, and resources (Peluso 1992a; Peluso and Vandergeest 2001). While the Dutch issued an ordinance in 1924 enabling the establishment of forest reserves in the Outer Islands, including Borneo, there was little demarcation of reserve forests in eastern Borneo prior to World War II (Peluso and Vandergeest 2001). Under Sukarno's rule after independence, the forestry service began to expand its presence in Borneo with a mission to classify and administer forest areas in support of national development. These activities continued after the creation of the forest estate by the Suharto regime in 1967, culminating in the early 1980s in the Consensus Forest Land Use Plan (*Tata Guna Hutan Kesepakatan,* TGHK), which classified areas of the forest estate according to their permitted land uses. Forest classifications comprise nature reserve or conservation areas, protection forests, limited production forests, normal production forests, and conversion forests. Conservation and reserve forests are geared to the protection of biodiversity and ecosystem function, protection forests are intended to protect soil and hydrological functions, limited production forests are open to low-intensity selective logging, normal production forests are open to more intensive logging, and conversion forests may be fully logged and converted to agricultural or other land uses. These classifications are ostensibly based on topographic and climatic characteristics, including slope,

soil type, and rainfall intensity. These forestry exercises were intended to guarantee the scientific management of Indonesia's forests in the national interest. As Vandergeest and Peluso write:

> "In Kalimantan, professional forestry found expression in highly elaborate land use exercises that were carried out by various land management agencies. At the local level, however, foresters were not necessarily able to translate this into autonomous control over forest resources. Foresters had little direct or actual control over the military branches with timber concessions and civil administrators who had interests other than implementing sustainable logging or conservation plans. Some foresters collaborated in corruption, a much easier alternative than enforcing legal controls. Foresters, civil service officials and members of the military who protected the companies' operations were commonly known to be corrupt. Indonesian foresters frequently referred to their institution as 'the golden ministry', and with good reason….
>
> "Overall, the example of Kalimantan demonstrates the irony of professional forestry. On the one hand, the land use planning and other development exercises were intended to render landscapes and subjects visible, legible and 'sustainable'. On the other hand, the actual practices of foresters (and others) were often illegal and intended to produce illegibility and obfuscation." (Vandergeest and Peluso 2006, 52–53)

In practice, the impulse for scientific management of Indonesia's forests has been overwhelmed by extractive interests that have refashioned institutions such as the forestry service to their benefit.

National parks in Indonesia were first established in 1980 as part of a global wave of national park creation (W. Adams and Hutton 2007; Gaveau, Linkie, et al. 2009). Even this sacrosanct category of international conservation proved largely incapable of protecting Indonesian forests, however. While David Gaveau and his collaborators have found reductions in deforestation in protected areas in Sumatra relative to the surrounding landscape, they also report large-scale logging and deforestation within protected area boundaries (Gaveau, Epting, et al. 2009; Gaveau, Linkie, et al. 2009). In Kalimantan, 56 percent of protected lowland forests, an area of 29,000 km^2, were deforested from 1985-2001, with the expansion of oil palm plantations and decline of timber stock in logging concessions helping to drive industrial logging operations into national parks and conservation and protection forests (Curran et al. 2004). In an econometric

analysis of determinants of deforestation in Indonesia for 2005-2010, Wheeler et al. (2011) demonstrated that deforestation in the country was significantly determined by economic factors (palm oil and wood products prices and demands, the exchange rate, and the real interest rate), whereas they found no significant impact of protected area status on deforestation. At Lore Lindu National Park in Sulawesi, the focus of The Nature Conservancy's Terrestrial Program during the first decade of its work in Indonesia, Tania Li describes endemic illegal logging in the park and the encroachment on the park in 2001 by 1030 households that settled and cleared park land for agriculture (Li 2003). In short, the national park model promoted in the 1980s and 1990s in Indonesia by international environmentalist actors such as UNDP, IUCN, the Asian Development Bank, and NGOs such as TNC had virtually no effect on the national deforestation rate and largely failed to avoid deforestation even within designated protected areas.

Destructive logging and forest conversion have severe impacts on the livelihoods of local peoples, and in some instances communities and civil society organizations have mobilized to oppose dispossession and extractive expansion. Communities living within Indonesia's forest estate have few formal legal rights to their land. Rural political mobilization had strengthened under Sukarno, especially with communist efforts to organize plantation workers, but after Suharto came to power amidst the killings of hundreds of thousands of alleged communists, rural society was heavily repressed and depoliticized. Peluso et al. (2008) affirm that "Until the 1980s, the New Order state successfully maintained such overwhelming power and control that rural protest was almost unknown" (382). Attempts to articulate an 'indigenous' identity and politics in Indonesia connected to the international indigenous peoples' movement were likewise dismissed by the political establishment (Li 2000). The 1980s and 1990s saw nascent mobilization around environmental justice and indigenous people's discourses, which recast issues of land rights and

dispossession that had been a focus for the peasant movement. With the fall of Suharto, civil society in Indonesia gained greater space to organize, and agrarian reform, social forestry, and access for local communities to state forest lands all became topics of public debate (Peluso, Afiff, and Rachman 2008).

Domestic environmental NGOs, indigenous peoples' associations, agrarian movements, and international environmental organizations have formed shifting alliances during the Reformasi period. A general cleavage highlighted by the small farmer encroachment in Lore Lindu is between agrarian and environmental justice groups seeking to redress past dispossessions by supporting small farmers' access to forest lands, and international environmental NGOs and indigenous peoples' associations seeking to avoid new dispossessions by protecting forest land from extractive expansion (Li 2003). A notable victory for the indigenous rights movement was a 2013 Constitutional Court decision supporting traditional communities' customary rights to their forest lands, though the government bureaucracy has been reluctant to implement the decision, and little has so far changed on the ground ("Forestry Ministry Reluctant to Relinquish Control over Forests" 2014; Rogers 2016). *Ad hoc* actions by communities and their allies at times check industrial expansion, as in Berau where villagers were able to halt activities in a logging concession until TNC brokered a 'collaborative forest management' agreement between them and the logging company, and where local communities with support from TNC succeeded in canceling an oil palm concession. The ability of communities to maintain forest-dependent livelihoods and resist industrial expansion may be undermined, however, by the landscape-scale expansion of industrial plantations and mining, a conundrum I discuss further in the case study of Berau.

Lastly, the Reformasi period in Indonesia has coincided with a consolidation of ecological modernization in global environmentalist policy discourse. The 'sustainable commodities' model

pioneered by FSC in the 1990s was taken up by WWF to convene the multi-stakeholder Roundtable on Sustainable Palm Oil (RSPO) in the early 2000s. REDD initiatives in Indonesia were boosted when the country hosted the UNFCCC 13th Conference of the Parties (COP13) in Bali in 2007. The Director-General of the Forest Research and Development Agency (FORDA) of the Ministry of Forestry was supportive of REDD policy and had helped establish the Indonesia Forest Climate Alliance in 2006, which received funding from Australia, Germany, and the UK under the coordination of the World Bank to bring together government officials from Forestry and other ministries, researchers from institutions such as CIFOR, and representatives of environmental NGOs including TNC and WWF to develop a basis for REDD policy in Indonesia (TNC27 141219). Following the Bali Conference, Indonesia joined the UN-REDD Programme and signed a Letter of Intent with the Government of Norway in which Norway pledged up to $1 billion to support Indonesian REDD efforts. Under the agreement with Norway, Indonesia committed to develop a national REDD strategy, establish an agency for REDD implementation, and impose a two-year moratorium on new concessions for the conversion of peatlands and natural forest (Government of Norway/Government of Indonesia 2010).

REDD and RSPO share the ecological modernization premise that capitalist development can be made compatible with environmental protection. While the RSPO understands sustainability to include the decoupling of oil palm production from deforestation, at least of primary forest areas, most REDD discourse in Indonesia has been premised on the idea that carbon credits would finance forest protection, and national REDD strategy, focused on the forest estate under control of the Ministry of Forestry, has for the most part dissociated the question of reducing deforestation from the question of plantation expansion (e.g., Masripatin 2010). As Casson et al. observe, “Within Indonesia, climate change policy is rarely consistent with other sectoral policies.

For example, policies that promote the expansion of palm oil (both for food and biofuel production) into new areas often conflict with climate change policies designed to reduce emissions from deforestation and degradation" (2015, ix). A more holistic 'green growth' perspective has been taken up in some pockets of the government bureaucracy, particularly in relation to national and provincial greenhouse gas reduction plans, which are coordinated by the Ministry of National Development Planning (BAPPENAS) and pertain to multiple sectors, including agriculture and forestry. These plans express support for land sparing policies to limit deforestation from smallholder agriculture and direct plantations away from forested areas and toward degraded lands (DNPI Indonesia 2010b; DNPI 2011; Government of Indonesia 2011b), but green growth policy making is obstructed and overshadowed at the national level by extractive coalitions. Anderson et al. (2016) describe 'anti-reform coalitions' including private sector companies and government actors that have opposed the moratorium on primary forest and peatland concessions, scuttled a zero-deforestation pledge by major palm oil companies, and supported the 2011 Master Plan for the Acceleration and Expansion of Indonesia's Economic Development (MP3EI), which proposes massive investments in infrastructure, natural resource sectors, and agro-industry while initially omitting any consideration of greenhouse gas reduction goals.

While the national-level extractive regime remains largely unshaken, REDD and green growth advocates have sought gains at the subnational level with pilot programs and demonstration activities. East Kalimantan Province, the focus of TNC-Indonesia's Terrestrial Program, has been at the forefront of these subnational forest governance and green economy efforts.

East Kalimantan: The Green Province

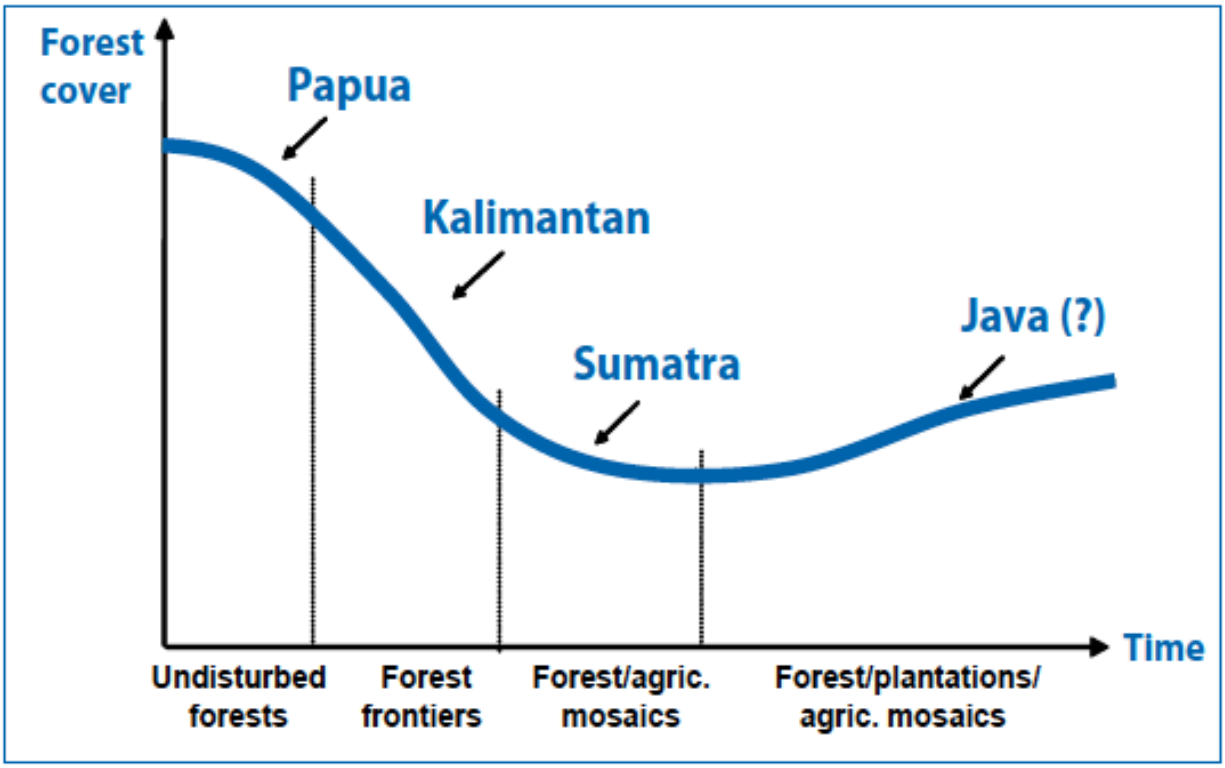
East Kalimantan is in many respects a 'best case' province in Indonesia for pioneering a transformation from extraction to a productivist, 'green' economy. Under Dutch colonialism,

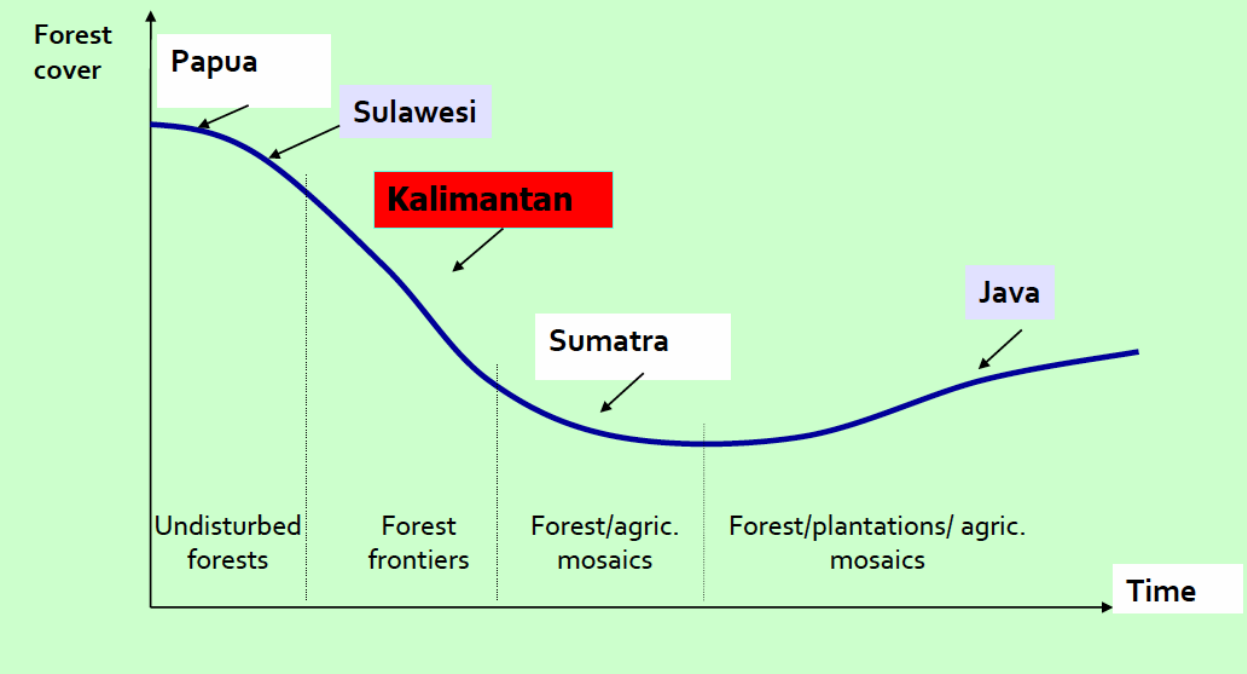
Sumatra was an intensively exploited internal periphery, but large-scale logging began in Kalimantan only in the 1970s, and oil palm plantations expanded first in West Kalimantan beginning in the 1980s and in Central Kalimantan from the 1990s onwards. Industrial land use in East Kalimantan continued to be dominated by forestry, while the oil and gas industries in the province grew during the 1980s, followed by the expansion of coal mining in the 1990s. Industrial logging operations began to decline towards the end of the 1990s, and the number of permits for tree fiber and oil palm plantations grew from the mid-1990s into the 2000s, as did plantation area, although in many cases plantation concessions were used as a front for timber exploitation and never planted (Obidzinski and Andrianto 2005).

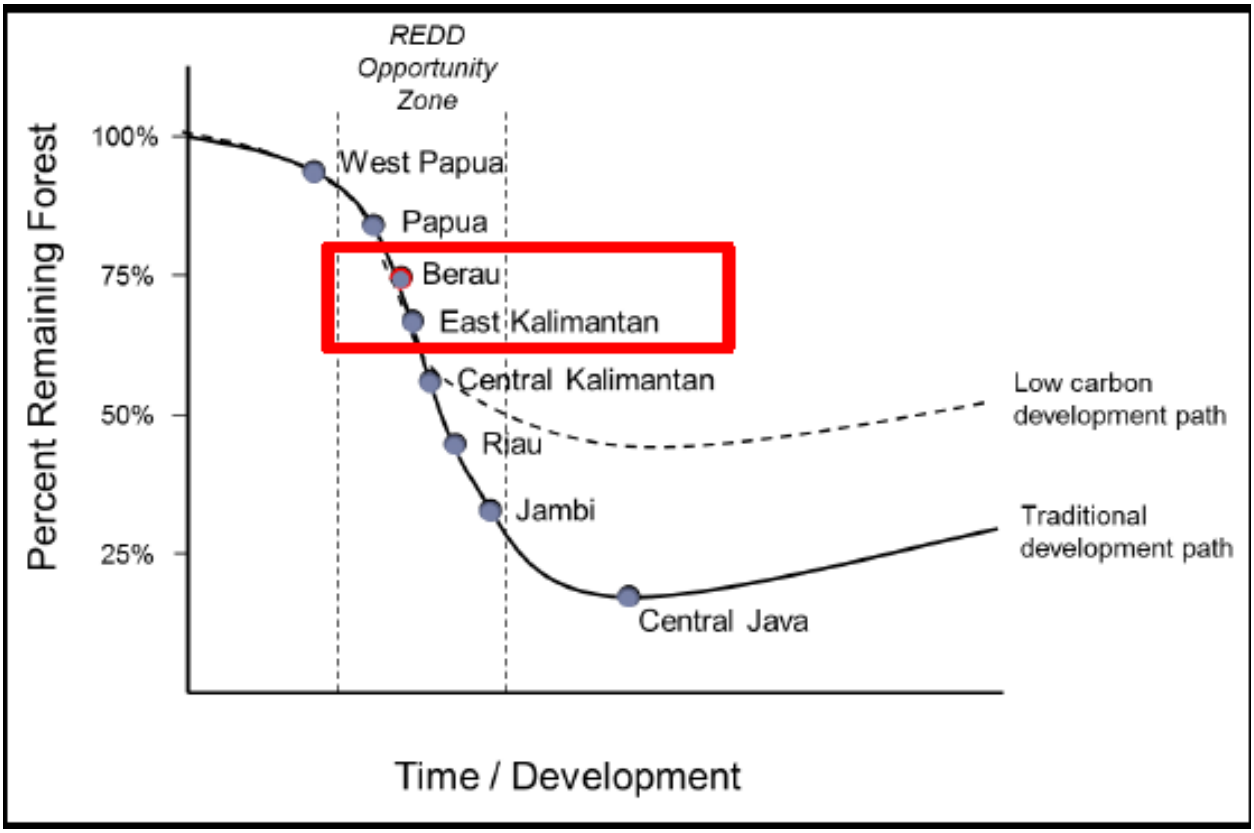
By the 2000s, as TNC began to develop its East Kalimantan Program and REDD gained prominence in forest governance discourse, East Kalimantan contained the largest remaining areas of lowland rainforest in Kalimantan.[25] To the forest transition thinking of eco-modernist researchers, NGO staff, and government officials, rising rates of forest conversion for mining, oil palm, and tree plantations denoted East Kalimantan as a frontier area squarely within the 'REDD Opportunity Zone' for a low carbon development transformation (Figures 5.1-3). The province had substantial experience with international forest research and conservation programs. In 1989, French researchers began a long-term study on forest regeneration known as the STREK project, which was conducted in partnership with FORDA and the state logging company PT Inhutani I in Inhutani's Labanan concession in Berau. This project subsequently became part of the Berau Forest Management Project (BFMP), a $12 million EU-funded project from 1996-2002 that

[25] In October 2012, the four northernmost districts of East Kalimantan split to become the new province of North Kalimantan (Kalimantan Utara). These four districts are for the most part heavily forested, and the creation of North Kalimantan has substantially reduced the total area of primary forest in East Kalimantan. Nonetheless, large areas of primary forest remain in the north (Berau) and interior of present-day East Kalimantan. For the purpose of consistency and unless otherwise noted, statistics given for East Kalimantan pertain to the whole of present-day East Kalimantan and North Kalimantan provinces.

conducted research on forest management and developed a proposal for a Clean Development Mechanism carbon forestry project in Berau (Oosterman 2000). CIFOR, created in 1993 with its headquarters in Bogor, Indonesia, outside of Jakarta, also developed a close relationship with East Kalimantan, where from 1996 onwards the organization had privileged access to a 300,000 ha research forest adjacent to Kayan Mentarang National Park in present-day Malinau District (Rhee 2006). Beginning in 1994, the German Government and its cooperation arm GTZ supported the Integrated Forest Fire Management Project, which ran for a decade in partnership with the provincial forestry authorities. When TNC carried out its eco-regional assessment, shortly after the launch of its East Kalimantan Program in the early 2000s, it found that "almost all of the available geologic, vegetative and cultural information for Kalimantan has been gathered only for this province due to its rich natural resources and a host of local and international companies seeking to exploit them" (TNC-Indonesia 2004, I:7).







Figures 5.1-3: 5.1) Forest transition curve for Indonesian islands from a CIFOR report published prior to COP13 in Bali on the implications of deforestation research for REDD policy (Kanninen et al. 2007, 11); 5.2) Forest transition curve for Indonesian islands from a 2015 presentation on

REDD in Indonesia by an official from the Forestry Research and Development Agency (FORDA) of the Ministry of Environment and Forestry (Wibowo 2015); 5.3) forest transition curve from 2014 TNC Overview of the Berau Forest Carbon Program presentation showing locations of Indonesian provinces and Berau District on a conceptual curve and identifying a REDD Opportunity Zone (Hovani 2014). Note that the forest transition is assumed to operate regardless of scale: these graphs include districts, provinces, and islands, and much forest transition literature uses a national level of analysis (e.g., Kauppi et al. 2006).

East Kalimantan's political economy has developed squarely within Indonesia's national extractive regime. In addition to its reliance on oil and gas exploitation and coal mining, the province has been a site of rampant illegal logging. In Berau and East Kutai districts, Obidzinski and Andrianto (2005) describe a multitude of illegalities in the forestry sector including cutting outside of designated areas, land clearing for dubious plantation schemes, unlicensed logging operations, under-reporting of timber harvests, and tax evasion, all feeding economic rent extraction by individuals, government institutions, and companies. They estimate annual budgetary losses due to illegal forestry in each district at over $11 million in 2003. As a provincial official put it succinctly, "The wood is gone, and we got nothing from it" in terms of development (BAPPEDA01 150324). Suwarna Abdul Fatah, a retired army Major General, was Governor of East Kalimantan from 1998 until 2006, when he was removed from power due to a corruption inquiry. He was ultimately convicted of improperly issuing permits for 1 million ha of oil palm plantations in Berau, which were logged but never planted, causing losses to the state of nearly $40 million (CIFOR 2010).

Governor Suwarna's next elected successor was Awang Faroek Ishak, the former bupati (district head) of East Kutai, who ascended to the governorship in 2008. A number of current provincial level officials and NGO actors had previously worked with Awang when he was bupati in East Kutai, creating continuities between the history of forest governance in East Kutai and present provincial-level perspectives. In East Kutai, Awang as bupati and Riza Indra Riadi, head of the district Environment Agency, had worked with TNC staff to set up the Wehea Protected

Forest area. As governor, Awang made Riza head of the provincial Environment Agency, while some of the same TNC staff members involved in the Wehea project today direct TNC's East Kalimantan Program. Awang came to the governorship at the same time as a wave of REDD activity following the 2007 Bali Climate Conference. A provincial REDD Working Group was already in existence, supported in part by TNC, and TNC and others encouraged Awang to enlist East Kalimantan in the Governors' Climate and Forests Task Force, which had been founded in 2008 by US states (California, Illinois, and Wisconsin), Brazilian states (including Mato Grosso and Pará), and Indonesian provinces (Aceh and Papua) to support the development of REDD.

In 2009, Awang traveled to California, where he met Governor Arnold Schwarzenegger and participated in the Governors' Global Climate Summit. In the account on Awang's personal website, "At the the meeting that last week of September 2009 in Los Angeles (LA), these two men, each important in his respective region, exchanged souvenirs. Awang Faroek Ishak gave [Arnold] a red ruby ring from Kalimantan, while Aarnold [sic] gave Awang Faroek Ishak a position as the eleventh permanent member of the Governor Climate and Forest (GCF) [Task Force]" ("Derap Langkah Kurangi Pemanasan Global - Anggota Tetap GCF vs Permata Merah Delima" 2015). This meeting with Schwarzenegger motivated Awang to move forward with a green agenda (TNC35 150321).[26] In 2010, he convened the district heads and mayors of the province to launch the Green East Kalimantan Declaration, which asserted a commitment to environmentally

[26] Awang's esteem for Schwarzenegger has proved enduring. East Kalimantan is serving as Chair of GCF in 2017, and Awang has made it known that he intends to invite Schwarzenegger to the GCF Annual Meeting in Balikpapan, although Schwarzenegger is no longer governor of California: "'Arnold Schwarzenegger has promised me that he will come if GCF is held in East Kalimantan in order to enliven the event,' Awang Faroek said in Samarinda on Sunday, Feb. 12. The east Kalimantan governor said Arnold Schwarzenegger will be invited since he was one of the co-founders of the GCF. 'Arnold Schwarzenegger and I [among others] had co-founded the GCF,' Awang Faroek said. According to Awang Faroek, Arnold Schwarzenegger's presence will make East Kalimantan proud and would be an honor for The Terminator actor. 'We will invite him as an individual not [as part of an] institution. I hope he will be willing [to come] and I still have his personal number. We expect Arnold to give a speech on environmental conservation, particularly to anticipate global warming,' Awang Faroek explained" (*Tempo* 2017).

sustainable development, and included a clause "recognizing that global warming is happening that causes global climate change, one of the causes of which is deforestation and forest and land degradation, so it is important to prevent forest destruction and improve the quality of forest through restoration, reforestation, and forest and land rehabilitation" ("Deklarasi Kalimantan Timur Hijau" 2010).

"*Kaltim Green"* ("Green East Kalimantan"[27]) became one of the principal slogans of Awang's administration. When I visited the East Kalimantan capital of Samarinda in 2015, the slogan was displayed prominently over the entry to the Governor's Residence (Figure 5.4).

[27] *Kalimantan Timur*, the Indonesian name for East Kalimantan, is frequently abbreviated to "Kaltim."

Figure 5.4: East Kalimantan Governor's Residence displaying slogans "Kaltim Green" and "Develop Kaltim for All," 27 February 2015.

Under Awang, the provincial government adopted a discourse of green development. According to a long-term advisor to the governor, after East Kalimantan's timber boom and subsequent

reliance on oil and gas and mining, members of Awang's administration realized that their economic model built on natural resource extraction had degraded the natural resource base and caused problems including natural disasters (e.g., floods, landslides), extreme income inequality across districts, poverty, and unemployment (KALTIM03 150307). "Permits [for logging, mining, and plantation concessions] were being given without good control," one of the governor's assistants told me, "Coal and forest exploitation have been too rapid, and areas were becoming degraded" (KALTIM04 150310). "We realized we were doing development wrong," a provincial planning official told me. The answer, he affirmed, is that "before fossil fuels are exhausted, we need to increase our renewable sectors, especially agriculture. Agriculture has higher labor requirements and will reduce unemployment. …We want an economic transition from non-renewable resources to renewable resources based on plantations, farming, and processing and manufacturing" (BAPPEDA01 150324). Green growth in East Kalimantan, it turns out, is rooted in large-scale plantation agriculture and agro-industrial development.

The agro-industrial model advocated by members of the green growth coalition in East Kalimantan seeks to move from simple resource extraction to a productivist model of resource transformation, integrating palm oil production with food processing and biofuel operations, for instance, and coal mining with petrochemical industries (BAPPEDA01 150324). Land sparing ideas are woven through the modernization discourse of actors in East Kalimantan's green growth coalition. Awang supports expanding tree fiber plantations to avoid clearing of natural forest areas (Ghofar 2015; KALTIM03 150307; KALTIM04 150310) under a logic that suggests that high-yield fiber plantations could help meet wood demand and reduce illegal logging. (TNC's own scientists have argued, however, that the tradeoffs between logging of natural forests and monocultural fiber plantations are complex and not well captured by a simplistic logic of 'forest

sparing' (Griscom and Goodman 2015; Griscom et al. 2017).) Arguments for land sparing via agricultural intensification are occasionally heard at the provincial level. East Kalimantan's Environmentally Sustainable Development Strategy, for example, calls for boosting yields of smallholder agriculture while limiting the use of fire (DNPI 2011, 121). Smallholder production receives far less attention than industrial sectors in provincial green growth discourse, however. The provincial strategy also includes "productivity gains to replace some expansion of [oil palm] concessions" (DNPI 2011, 79). A long-time Indonesian employee of GIZ, the German cooperation program, emphasized in our interview the potential for land sparing by developing efficiency and increasing yield in the oil palm sector, asserting that "Indonesia can double its palm oil production without converting forest" (GIZ02 150303).

More prominent than arguments for land sparing via agricultural intensification in the provincial ecological modernization discourse are arguments for land sparing via land use intensification. Numerous government officials, local academics, and NGO actors promote land use intensification arguments for identifying degraded lands and siting plantation expansion in degraded areas. The Regional Climate Change Council (DDPI) in East Kalimantan, an *ad hoc* government policy forum, has undertaken a mapping of degraded or 'critical' lands in the province according to biological, chemical and physical criteria (KALTIM08 150513, KALTIM01 150305). In a message to a provincial level seminar, Governor Awang stated that there are 7.9 million ha of degraded land in the province,[28] which would represent roughly two-thirds of the total provincial land area. A provincial discussion document on "optimizing land use management" states that "areas with high carbon values need to be identified and prioritized for conservation,"

[28] Governor's Message to "Seminar Implikasi Undang-Undang Nomor 23 tahun 2014 tentang Pemerintahan Daerah dalam Tata Kelola Sumberdaya Alam di Provinsi Kalimantan Timur," 23 March 2015, Governor's Office, Samarinda, East Kalimantan, from author field notes.

while simultaneously highlighting the need to "ease productive access to degraded land" and noting that "there is a large amount of degraded land in [the] forestry estate that are [sic] suitable for oil palm" (Daryanto 2011, 12–16).

Borras and Franco have comprehensively critiqued the argument for large-scale agricultural expansion on 'degraded' lands in the Global South, arguing that lands classified as 'degraded' are rarely empty or unused (despite being perceived as such by government and corporate planners), and advocating for plantation expansion on degraded lands reframes plantation expansion as an essentially positive development model that simply needs to be properly 'managed' (2010, 511–13). The particular history of Indonesia, where the Dutch appropriated forest and fallow land as 'wasteland' under the Domain Declaration, reinforces this critique of the degraded lands discourse as a justification for agro-industrial expansion (cf. Montefrio and Dressler 2016). A letter to *The Jakarta Post* (2010) put it bluntly, "the term 'degraded' is synonymous with idle, marginal, unproductive, empty or wasted, and is derived from the similar colonial concept and model." When coupled with arguments for forest conservation, the argument for agricultural expansion on degraded lands intertwines with land sparing arguments and modernization discourses promoting the intensification and optimization of land use.

In practice, redirecting plantation expansion to degraded lands faces numerous difficulties. Land swaps to shift existing permits from forests to degraded lands are so administratively complex that most informants consider them unviable (TNC31 150205, DISHUT02 150310), so current discourse emphasizes siting new plantations in degraded areas. Plantation expansion on degraded lands as opposed to forests could have substantial environmental benefits, but degraded lands are not generally found in contiguous areas of sufficient size for plantations, there are high transaction and regulatory costs for securing concessions on degraded lands since they are often

subject to multiple and overlapping land claims, and there are fewer opportunities for rent extraction when opening plantations on degraded lands, since in many cases operators will use profits from timber sales from forest clearing to finance plantation establishment (if they intend to establish a plantation at all) (DNPI Indonesia 2010a; Daryanto 2011; BAPPEDA01 150324). The incentives of the extractive regime thus support plantation expansion through forest conversion.

In 2013, Awang declared a moratorium on new logging, mining, and plantation concessions in the province, ostensibly to give time to inventory and evaluate existing concessions. Concession permits are issued at the district level, but then require a provincial recommendation for approval. The moratorium on new concessions should in principle lay the groundwork for a provincial land use transformation, but in practice it did little to slow the expansion of mining or plantations into forested areas. When the moratorium was issued, 2.4 million ha of the province had already been permitted for oil palm, while only 1 million ha had so far been planted (East Kalimantan Government 2013). As one of the governor's staff observed, "permits have been pretty much fully issued over East Kalimantan's territory, so now we have a moratorium" (KALTIM08 150513).

A green East Kalimantan may involve no new permits for deforestation, but vast areas may still be cleared under existing permits for oil palm plantations, in addition to whatever expansion occurs on ostensibly 'degraded' lands. The productivist project for 'renewable' agro-industry in the province also involves the construction of a major port facility and creation of a Special Economic Zone at Maloy in East Kutai, which was included in the national government's MP3EI development plan. Maloy is promoted as a future hub for palm oil, biodiesel, and petrochemical industries, and its construction is intended to help spur development in a new part of the province, rather than reinforcing the existing hubs of Bontang, Samarinda, and Balikpapan (BAPPEDA01

150324). It is hard not to see a pork barrel, however, in the proposal for massive industrial development in the Governor's home district. One informant alleges that Awang and his cronies have bought up the land around Maloy on speculation, and that Awang has also been involved in land speculation around Kutai National Park, where road projects linked to the Maloy corridor will pass (KALTIM05 140311). Even in a green province, politics in Indonesia is still a business. "Awang declared 'Kaltim Green,' but you can't find it in the regulations," an environmental lawyer told me, "it's just a slogan" (UNMUL02 150324). "Kaltim has been an early adopter of ideas [such as REDD], but slow in implementation" mused an Indonesian who has worked for many years with the German cooperation program in the province, "Before COP13 in Bali we already had a REDD task force, but now on the ground [in 2015] not that much has changed. This phenomenon in itself is political" (GIZ05 150427).

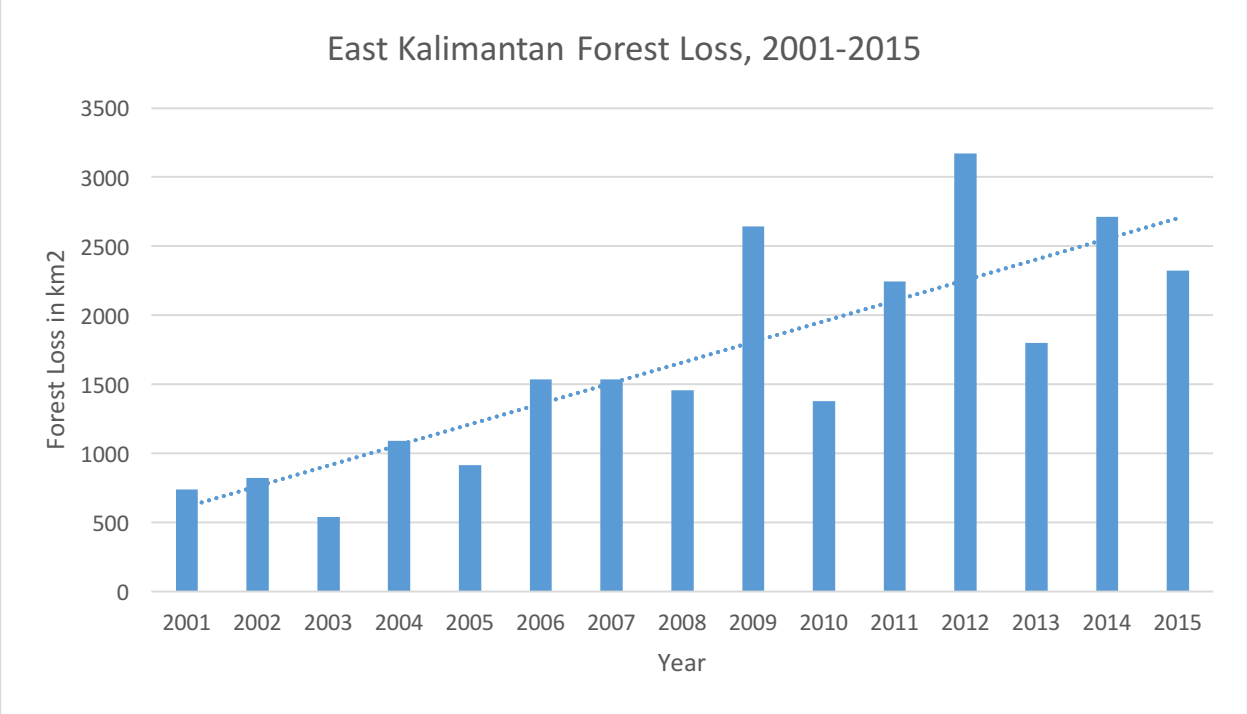


Figure 5.5: Annual forest loss in East Kalimantan (since 2012, East Kalimantan and North Kalimantan), 2001-2015, at >30 percent canopy density (Hansen et al. 2013); trend line $R^2 = 0.70$.

Forest loss in East Kalimantan has accelerated significantly since 2001 (Figure 5.5). This acceleration has occurred despite East Kalimantan declaring itself a green province in 2010, imposing a moratorium on new concessions in 2013, and being a magnet for REDD programs. In addition to the province's membership in GCF, Germany's FORCLIME project and TNC's Berau Forest Carbon Program were designated by the Ministry of Forestry in 2009 as two of four official REDD demonstration activities in Indonesia (Masripatin 2010). In the case studies that follow, I compare forest governance and land use change in East Kutai and Berau districts (Figure 5.6). Both districts were identified as priority areas for forest conservation by The Nature Conservancy's East Kalimantan Program due to their remaining expanses of lowland and upland forest, large orangutan populations, and the distinctive karst landscape shared along their border on the Sangkulirang Peninsula (TNC-Indonesia 2004; P. Wells, Paoli, and Suryadi 2010). Berau became the best case district in the best case province for forest governance, as it became the site of TNC's district-level REDD project, the Berau Forest Carbon Program. East Kutai was not targeted by TNC for a district-level program, but it is the site of a highly publicized collaboration between TNC and the Wehea Dayak indigenous group for the management of a protected forest area. At the same time, East Kutai has been a center of oil palm expansion in East Kalimantan, the district has been massively transformed by plantation agriculture and coal mining, and rapid deforestation continues. The comparison here is not based on the perceived 'success' or 'failure' of TNC's programs, but rather it provides a contrast between a protected area conservation model in an extractive landscape in East Kutai and an attempt at ecological modernization through jurisdictional REDD in Berau. Ultimately, the political economy of Berau remains extractive, however, and deforestation in the district is accelerating. I begin with the case of East Kutai to

provide the extractive baseline, followed by the case of Berau to explore the efforts by TNC and its allies to engineer a land use transformation.

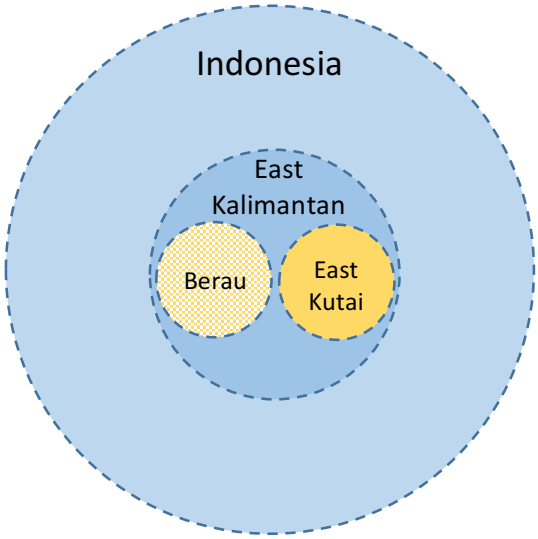


Figure 5.6: Nested case selection for incorporated comparison of tropical forest governance in Indonesia. Circles represent the national, provincial, and district levels. Borders at each level are porous. Berau district, which hosts a jurisdictional-level REDD project, is distinguished by a textured background pattern.

East Kutai: Forest Guardians across the Commodity Frontier

The district of East Kutai was created in 1999 through the breakup of the much larger district of Kutai as part of the 'blossoming' (*pemekaran*) of district creation that occurred after the fall of Suharto. Awang Faroek Ishak, now governor of East Kalimantan, served as the first bupati (district head). The creation of new districts was often an occasion for the creation and capture of new rents (Aspinall 2013, 39), and was finally paused by a moratorium in 2009. In a certain sense, then, East Kutai District was destined for extraction from its birth, and in the nearly two decades since its creation, the district has been a center for the virtually unbridled expansion of coal mining and oil palm and tree fiber plantations.

Of course, the extractive regime in East Kutai existed well before 1999. Kutai District was a center for logging, oil and gas production, and coal mining throughout the 20th century (Magenda

1991). The 350,000 ha Georgia Pacific concession was located in present-day East Kutai and began operating in 1971, and Kaltim Prima Coal (KPC) was formed in 1982 as a joint venture of BP and Rio Tinto and in the early 1990s began operating the Sangatta coal mine, an open pit operation with some of the world's largest thermal coal reserves, on the outskirts of the town of Sangatta, which is today the East Kutai district seat.

The climate of East Kutai, to the south of the Sangkulirang peninsula and its karst escarpments, is somewhat warmer and drier than Berau, and the district experienced earlier and more extensive logging and tree plantation development than its neighbor to the north. During the 1982-1983 and 1997-1998 El Niño years, fires burned vast areas of East Kutai. As Dennis and Colfer observe, "In addition to the contributing El Niño drought conditions, evidence suggests that increased logging and large-scale agro-industrial developments in tropical rainforests, and an increase in modified forest in general, has led to an increased fire risk and incidence both in and around these forests, creating a positive feedback loop whereby fire-affected forest becomes more prone to repeat fire damage" (Dennis and Colfer 2006, 31). They find that in a 2000 km^2 study area in East Kutai, 70 percent of forest that burned during the 1982-1983 El Niño had ceased to be forest in 2000. Similarly, Siegert and Hoffmann (2000) report that for their test area of 18,500 km^2 overlapping present-day East Kutai, 71 percent of the area burned during the 1997-1998 El Niño, with the most severe damage occurring in more heavily logged areas and tree plantations.

Logged and burned over areas of East Kutai became prime sites for the expansion of oil palm and tree fiber plantations (cf. Gaveau et al. 2016). With the creation of East Kutai as a new district in 1999, there were strong personal, institutional, and political incentives for officials to accelerate economic growth. As one district official recalls, "Around 2000, East Kutai was a new

district and there were many new permits, the largest number being for oil palm. As a new district, East Kutai wanted to grow quickly" (KUTIM03 150520). Another official expands:

> "Thirteen years ago, when the district was created, there was a need to speed development. There was the old model of HPH [industrial forest concession] management, but it wasn't very good. …Permits [on the concessions] were ending, and what was left? Sixty percent of the district area that hadn't been managed well. East Kutai needed to develop the economy and open new areas. The regulations permitted conversion, so the private sector came in to convert land. There wasn't much land use planning from the government: it was the companies that indicated which places were most appropriate for expansion. Many areas were converted to oil palm." (KUTIM05 150522)

In the early 2000s, as production from industrial logging concessions in East Kutai declined, the provincial and district governments issued large numbers of land clearing permits (IPK). "Expansion of IPK logging over last few years is directly related to East Kutai's plans to become the center of agro-business and agro-industry in East Kalimantan," Obidzinski and Andrianto wrote in 2005, "To accomplish this, the district authorities plan to clear 1.3 million ha of land/forest for large-scale plantations, mainly oil palm. As a result, IPK licenses are continuing to be issued by district authorities (even though the central government regulations prohibit this) and the allocated forest areas to be cleared are large" (2005, 80). By 2015, the provincial statistics bureau reported that over 424,000 ha in East Kutai had been planted to oil palm (BPS Provinsi Kalimantan Timur 2017).

East Kutai today is largely a post-frontier district that exemplifies wholesale landscape transformation under an extractive regime. Through cycles of extractive logging, fires, and plantation development, as well as large-scale mining, vast areas of forest have been cleared to the point where there is little forest area left to conserve (Figures 5.8-11). Roughly 14 percent of East Kutai is currently designated as protected forest or park areas, predominantly in the far west of the district and in the Sangkulirang karsts, although portions of the protected forest estate have been

seriously degraded. After the 1997-1998 fires, forest cover loss was lower at the beginning of the 2000s as industrial logging declined and plantations expanded in burned over areas, but since 2005 deforestation has accelerated (Figure 5.7), as it has in the rest of Kalimantan (Gaveau et al. 2016), as oil palm and tree fiber plantations have continued to expand, especially in the northwestern sub-districts of Muara Wahau and Kongbeng.[29]

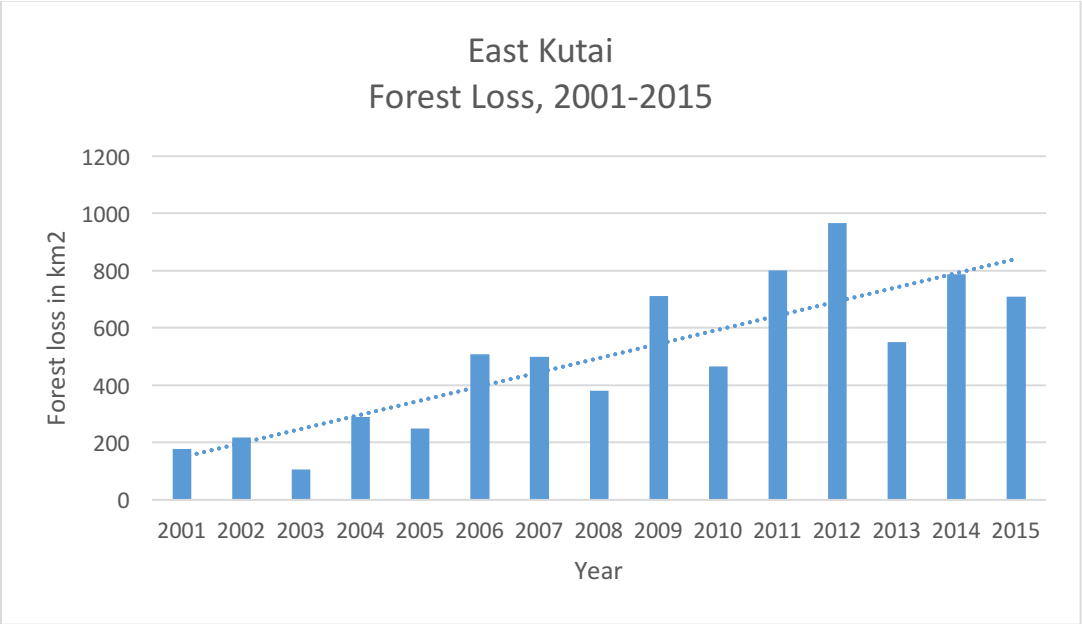


Figure 5.7: Annual forest loss in East Kutai, 2001-2015, at >30 percent canopy density (Hansen et al. 2013); trend line $R^2 = 0.73$.

[29] Kongbeng subdistrict (*kecamatan*) was excised from the subdistrict of Muara Wahau around 2004, but the Muara Wahau-Kongbeng area is still often referred to generically as Muara Wahau.

Figures 5.8-9: 5.8) Open pit coal mining by KPC at Sangatta, East Kutai, April 2015; 5.9) Recently cleared oil palm plantation in western East Kutai District, April 2015.

With the possibility of maintaining a large-scale intact forest landscape in the district foreclosed and extractive interests virtually hegemonic, there has been no coalition for land sparing in East Kutai. To the contrary, when Governor Awang imposed his moratorium on new forest, mining, and plantation concessions in East Kalimantan in 2013, the bupati of East Kutai protested, arguing that the moratorium on mining concessions would reduce the district revenue (Subkhan 2013). In contrast to the transformative ambitions of regional land sparing efforts, the few forest conservation initiatives in East Kutai operate largely within a protected areas model. In the words of Obidzinski and Andrianto, "there is a sense in the district that not much can be done but write off the already damaged or degraded forest areas and focus on agro-development and conservation in the remaining remote forest areas" (2005, 81). The Borneo Orangutan Survival Foundation (BOSF) operates an 86,000 ha ecosystem restoration concession that lies on the border between East Kutai and Kutai Kartanegara districts, which the organization uses for the release of rescued orangutans. The concession is issued by the Ministry of Forestry, and has had little interaction with the district government (KUTIM05 150522). It lies in a production forest area in the far west of East Kutai, and was still fairly well forested when taken over by BOSF. In the opinion of a former TNC scientist familiar with the project, reintroduction of rescued orangutans is "a welfare issue, but not a conservation tool" (TNC40 150529).

The Sangkulirang karst landscape has long been a secondary focus of TNC's East Kalimantan Program in both Berau and East Kutai districts. In 2004, for example, TNC sponsored a scientific expedition in the karst escarpments with the Indonesian Institute of Sciences that confirmed the karst forests as orangutan habitat and discovered, among other species, "probably the largest cave cockroach in the world and a very small blind crab" (Salas et al. 2005, 15). TNC

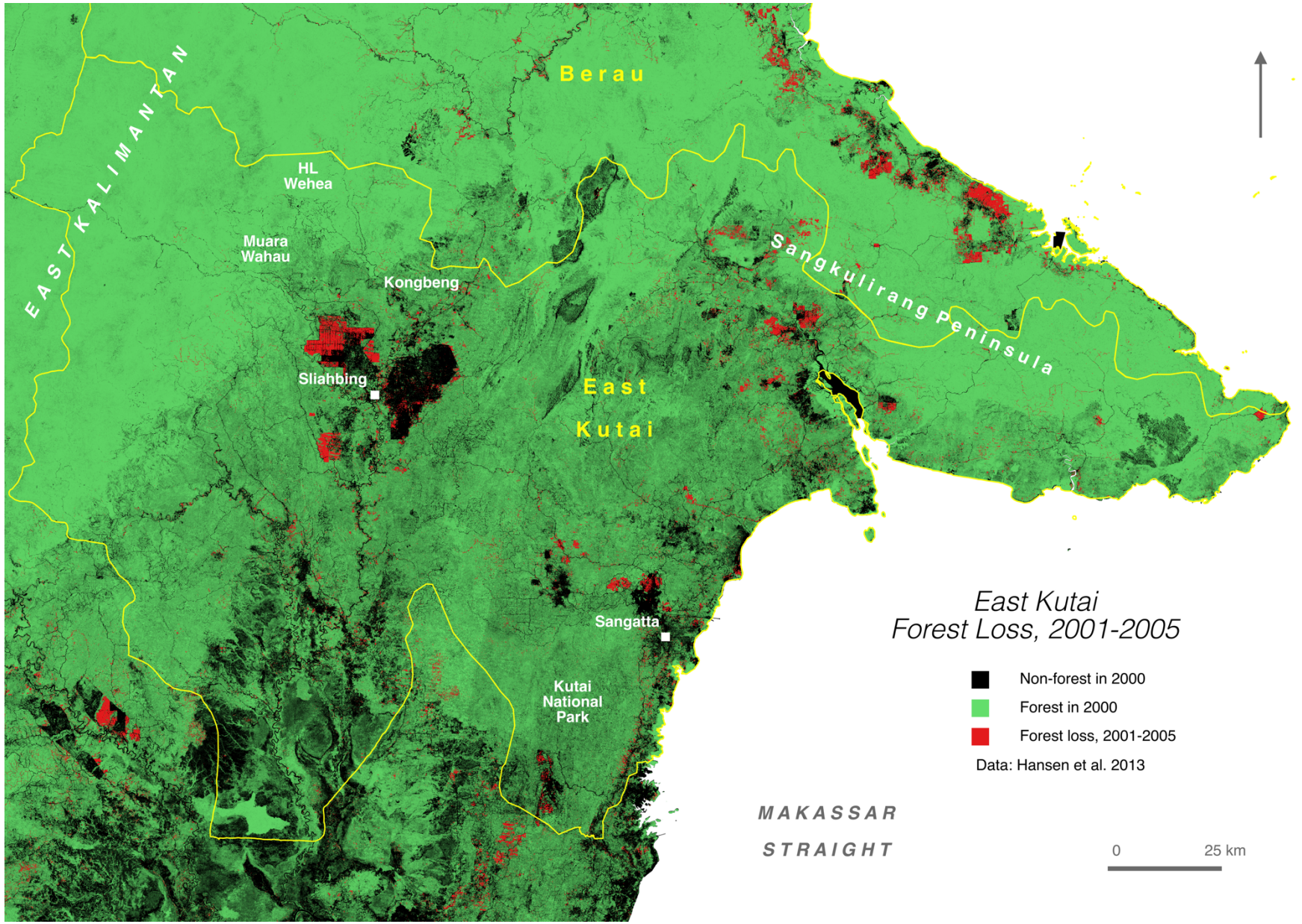
began to devote greater attention to management and policy for karst areas after 2009, with a particular interest in protecting the role of karst in the regional hydrology (porous karst limestone collects and filters water, and the Sangkulirang karst is the source of several important rivers) and as orangutan habitat (TNC33 150513). The karst escarpments are extremely rugged and inaccessible, so logging and hunting in these areas has for the most part been limited, but the karst limestone is an excellent material for cement production, and a number of lime and cement concessions operate or have been issued in the region, though generally over fairly small areas of a couple hundred hectares. One TNC employee confided to me that he feared that after logging and coal, cement could be the next wave of extraction, thus it was important to protect the karst now (TNC33 150319). TNC staff worked with the provincial government, in particular Riza Indra Riadi at the provincial Environment Agency, to secure a regulation from Governor Awang in 2012 protecting over 360,000 ha of karst landscape between East Kutai and Berau districts. While karst policy has been coordinated at the provincial level as a transboundary issue between the two districts, the district Environment Agency in East Kutai has supported the process, and both East Kutai and Berau districts collaborated with TNC and provincial authorities to nominate the Sangkulirang-Mangkalihat Karst as a UNESCO World Heritage Site (although the submission was ultimately made for recognition as a cultural heritage site in light of the large amount of prehistoric rock art in the karst area).

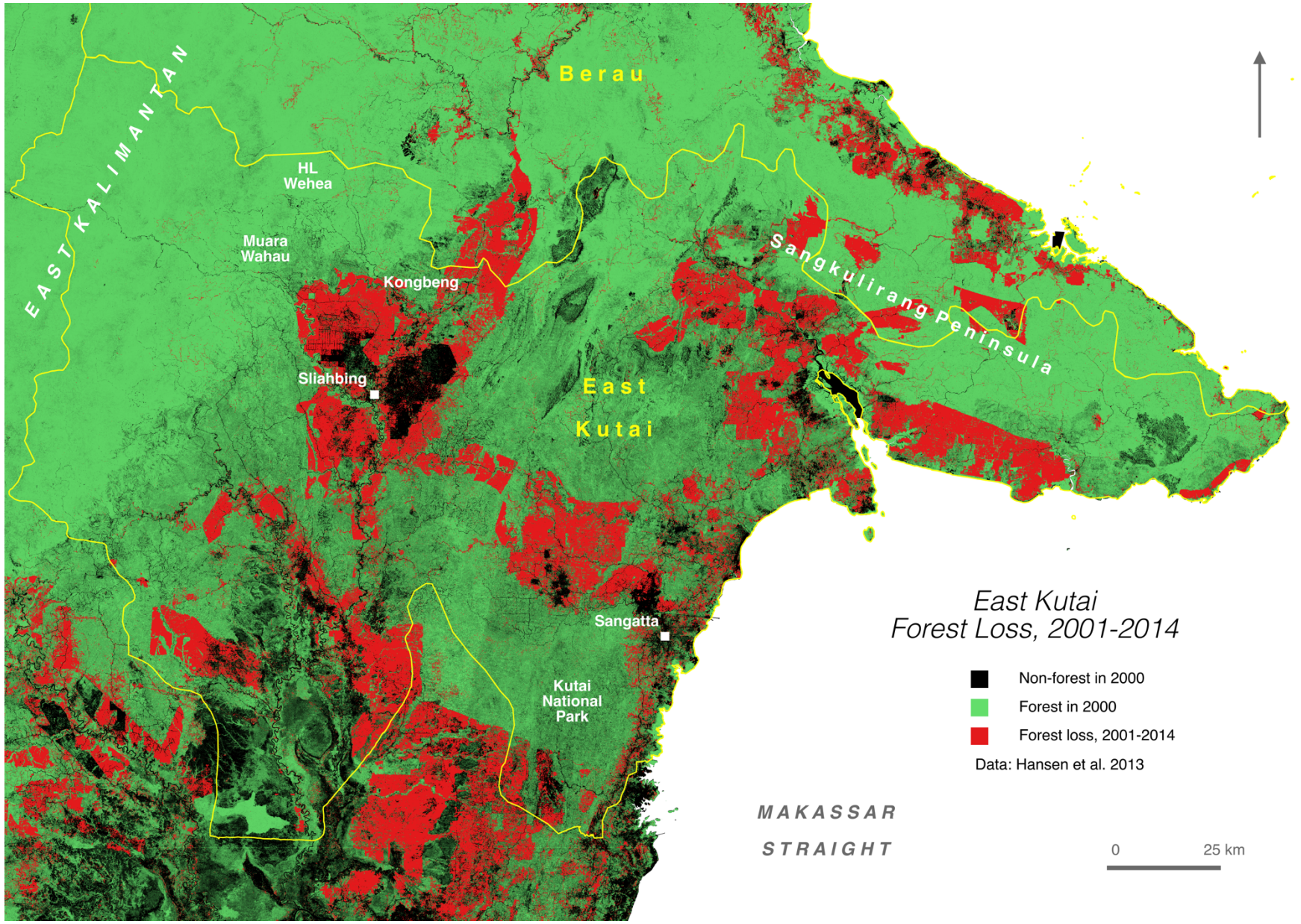
While the Sangkulirang karst is undoubtedly a unique and important ecosystem, that this unique and important ecosystem continues to exist in East Kutai as an object for environmental protection is a testament to its unsuitability for most other land uses. The karst was protected by default due to its inaccessibility for logging and it cannot be converted for agriculture, so declaring it protected gives the appearance of environmentalist action at very low cost to other interests. The

primary competing use for karst is for extraction of clay and lime and cement production, yet the Governor's Regulation identifies limestone areas in East Kutai and Berau of virtually equal size to the protected karst zone (over 350,000 ha) that will remain open to exploitation.

Beyond karst and the BOSF concession, the primary forest conservation initiatives in the district are the Wehea Protected Forest, established in the mid-2000s by TNC and the East Kutai government in cooperation with the Wehea Dayak indigenous group, and Kutai National Park, established in 1982 by the national government.

Figures 5.10-11: 5.10) Map of East Kutai showing forest loss in 2001-2005; 5.11) Map of East Kutai showing forest loss in 2001-2014, demonstrating large-scale deforestation after 2005.


EAST KALIMANTAN
Berau
HL
Wehea
Muara
Wahau
Kongbeng
Sliahbing
East
Kutai
Sangkulirang Peninsula
Sangatta
Kutai
National
Park
MAKASSAR
STRAIGHT
East Kutai
Forest Loss, 2001-2005
Non-forest in 2000
Forest in 2000
Forest loss, 2001-2005
Data: Hansen et al. 2013
0
25 km


EAST KALIMANTAN
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Sangkulirang Peninsula
Sangatta
Kutai
National
Park
MAKASSAR
STRAIGHT
East Kutai
Forest Loss, 2001-2014
Non-forest in 2000
Forest in 2000
Forest loss, 2001-2014
Data: Hansen et al. 2013
0
25 km

A Tale of Two Parks

The contrast between Kutai National Park and Wehea Protected Forest (HL Wehea) starkly illustrates the realities and limits of forest protection under an extractive regime. Kutai National Park lies in a coastal, lowland area easily accessible for extraction (especially of timber, oil and gas, and coal) and attractive for settlement and conversion. As a result, the park has been heavily logged, burned over, and encroached, and Pertamina, the state oil company, operates an oil concession on park land. The severe degradation of Kutai National Park contrasts with the strong protection currently enjoyed by the Wehea Protected Forest. HL Wehea is located in the western uplands of East Kutai on the border with Berau. While the area was previously under a logging concession, its fairly steep slopes protected it from excessive timber extraction or agricultural conversion. While the national park is administered by the national government, management of Wehea is led by the Wehea Dayak indigenous group, which collaborated with TNC and the district government to secure the protected forest designation. I briefly describe the fate of Kutai National Park, and then examine in detail TNC's program with the Wehea Dayak and district government in HL Wehea. I argue that the destruction of Kutai National Park and the protection of HL Wehea demonstrate the vestigial character of indigenous nature and culture in a landscape of unbridled extraction.

A Park, some Oil Wells, and an Airport

Kutai National Park was originally established as a game reserve by the Dutch in 1936, and in 1982 it was designated by the national government as one of Indonesia's first national parks. An area of 198,629 ha was gazetted to the park comprising a highly biodiverse lowland rainforest ecosystem that includes charismatic species such as hornbills, orangutan, and proboscis monkeys. Oil exploitation within the current park boundaries was initiated by the Dutch during the colonial

period, and some early migrants from Sulawesi settled in the park area in the 1950s and 1960s (Vayda and Sahur 1996). With the start of the logging boom in East Kalimantan in the late 1960s and 1970s, timber concessions operated within the park, while Pertamina, the national oil company, built drilling rigs, and the mining towns of Sangatta and Bontang grew on the park boundaries and were eventually connected by a road built across the park in 1991 (M. Moeliono and Purwanto 2008). The El Niño fires of 1982-1983 and 1997-1998 also heavily damaged the forests of the park: almost the entire area of the park burned in March and April 1998 (Siegert and Hoffmann 2000; Guhardja et al. 2000).

After the division of Kutai District in 1999, the new East Kutai government, led by Awang Faroek Ishak, sought to 'enclave' an area of the park near the Bontang-Sangatta road that had been heavily burned and encroached. The Ministry of Forestry did not fulfill the request at the time, and as Bontang and Sangatta grew during the 2000s and traffic along the road increased, thousands of migrants settled on park land. As Limberg et al. explain, "people regarded the area as offering economic opportunities, and the protected area as offering free land" (2009, 192). While most of the settlers were people of the Bugis ethnic group from Sulawesi, their successful encroachments on the park have sparked resentment among Dayak and Kutai groups who feel land is being given away to 'outsiders,' and who have responded with their own incursions (M. Moeliono and Purwanto 2008).[30] Politicians in East Kutai, including Awang, have played upon the conflicts, allegedly encouraging encroachments and promising land titles to gain political support or to profit

[30] In East Kalimantan, hunter-gatherer groups have historically been ethnic Punan. Indigenous upland agriculturalist groups in Borneo are generically known as 'Dayak,' though settled Punan may also refer to themselves as 'Dayak Punan.' I refer to all settled, upland, predominantly Christian or animist indigenous groups as 'Dayak.' These groups are distinct from the Muslim Kutai and other Malay populations that live primarily along the coasts (Colfer pers. comm.; Dounias et al. 2007).

from private land speculation (M. Moeliono and Purwanto 2008; UNMUL03 150309; KALTIM05 140311).

From around 2007 onwards, 'integrated teams' of district officials, park management, and civil society have sought solutions to the land conflicts in the park. The East Kutai district government has long demanded an enclave of over 24,000 ha from the park, claiming that the park is constraining the development of the sub-districts of South Sangatta and Teluk Pandan, which it overlaps (Chered 2014). In recent years, the district government has also become increasingly fixated on the idea of constructing an airport at Sangkima, which lies within the park. The integrated team and forestry officials agreed to recommend an enclave of 17,000 ha in a revision to the provincial spatial plan, which must be approved by the National Congress (*Dewan Perwakilan Rakyat* – DPR), but the final recommendation from the Ministry of Forestry to the Congress in 2013 was for an enclave of just 7816 ha, limited to already settled areas, including the area of the Sangkima airport. Governor Awang, standard-bearer of Kaltim Green, threw his weight behind the 17,000 ha reduction of the park, "I told the DPR working group [that visited the park], just look at the conditions on the ground, and the working group visited Teluk Pandan, South Sangatta, and Sangkima, which are in the park. They see that Pertamina is there. It's not possible if they only make an enclave of 7800 ha. …If DPR approves (the 17,000 ha enclave), then the plan for the Bontang-Sangatta toll road also won't be a problem. PLN [the electric company] can connect the area to the grid. But I'm sure, in accordance with the reality on the ground, DPR will definitely agree" (quoted in Hendar 2013). Only the more limited enclave of 7816 ha was approved, and the district and Ministry of Environment and Forestry have since 2014 been engaged in defining the exact boundaries of the enclaved area.

Although much of the discourse supporting the reduction of the national park has focused on the need to develop the southern sub-districts of East Kutai and to give tenure security and public services to the population living on park land, after agreement on the enclave was obtained, the East Kutai government has had no compunction in asserting its priorities. The site of the proposed airport at Sangkima is currently covered in oil palm planted by local people who had settled on park land. Ismunandar, the current bupati of East Kutai, says there will be no compensation for people who settled or are cultivating land that was formerly part of the national park: "'That land was property of the national government, and after the creation of the enclave, it is now fully owned by the government of East Kutai, and not individual persons.' …However, he continues, the East Kutai Government does not want to strong-arm people, so it will give compensation for the oil palm trees that are already planted. 'The district government will be generous in giving compensation for people's plantings. However, of course it will be done with a different calculus because the plantings were made on government land,' he said. 'For people who want to have rights to land, they have to follow the proper procedures'" (*Warta Kutim* 2017). For government officials, the destruction and reduction of Kutai National Park has been a question of their political fortunes and opportunities for extractive expansion and personal enrichment (rents will be extracted from the construction of an airport as surely as from any other industrial project in Indonesia, though the airport may also be desired for the personal convenience of the elites who will use it, or as part of broader goals for expanding coal mining in the park area). Migrant agriculturalists have been convenient pawns in elite maneuvers to reduce the park, but the welfare of the population is not the business of the extractive regime, and certainly cannot be allowed to stand in the way of a new airport.

Figure 5.12: Pertamina oil company billboard in Kutai National Park along the Bontang-Sangatta road in Sangkima: "Sangkima Eco-Tourism: Pertamina EP Sangatta Field is fully committed to the preservation of Kutai National Park," April 2015.

Protecting and Becoming Wehea: The Wehea Dayak and Their Forest

The Wehea Dayak people are heralded today as 'forest guardians' for their role in managing 38,000 ha of protected forest in the western uplands of East Kutai, an important orangutan habitat. Promotional images published by TNC depict a timeless, symbiotic connection between the Wehea people and the Wehea Forest. A special feature on Wehea on the TNC website is titled "Nature Provides Our Resources." Over a photograph of Ledjie Taq, the customary leader of the Wehea Dayak, dressed in a traditional hat and a shirt with Dayak designs, the website proclaims: "For the Wehea community in the heart of Borneo, nature provides food, water, shelter,

medicine and ceremonial resources" (TNC 2017a). "If the forest is gone, we lose our identity and culture too," declares Ledjie Taq on another TNC site titled "Watching Over Wehea" (TNC 2012). Here his photo appears alongside an ad for Suave, one of TNC's 'corporate supporters,' which is a subsidiary brand of Unilever, probably the world's largest corporate consumer of palm oil (Greenpeace 2008).

These images of the ecologically noble Wehea Dayak as primordial forest guardians elide a complex history. When I arrived in April 2015 in Nehas Liah Bing (Sliahbing), the largest of the six Wehea Dayak villages, I had read these TNC materials and spoken with numerous TNC staff members about the HL Wehea project. I expected to find myself in a traditional Dayak village located within a protected forest area. I was surprised to discover that Sliahbing is just a few kilometers outside the town of Muara Wahau-Kongbeng, the regional urban center, and that the village is completely surrounded by oil palm. The protected forest area is 90 km away, and the six Wehea Dayak villages, all in the area of Muara Wahau, lie in a landscape dominated by mines and oil palm plantations. There was a deep irony to that Suave ad.

The Wehea Dayak themselves, I would learn, have only gained recognition as a unique ethnic group in the past decade, while during the late 20th century they were often identified as Bahau, part of a distantly-related Dayak family. How did this group of people become recognized as the Wehea Dayak, and how did they become protectors of a 38,000 ha forest area 90 km from their villages?

Upland Borneo has been inhabited for centuries by indigenous groups of hunter-gatherers and swidden agriculturalists. In East Kalimantan, the nomadic hunter-gatherer groups have historically been Punan, while the more settled Dayak agriculturalist groups include the Kayan, Kenyah, and Modang, which trace their origins to the Apo Kayan highlands region on the present-

day boundary between North Kalimantan and the Malaysian state of Sarawak. The Wehea Dayak are a small group of Kayanic Modang people that live in six villages in the East Kutai sub-district of Muara Wahau. They number around 6000 people, roughly 4000 of whom live in Sliahbing.

The traditional livelihoods of the Wehea communities centered on shifting rice cultivation, complemented by extraction of forest products. From the late 1960s through the 1990s, their landscape was profoundly transformed by the arrival of industrial timber companies, migrant Dayak groups, and participants in the Indonesian Government's Transmigration Program (primarily Javanese families). Oil palm plantations were first established in the region in the late 1990s. In the early 2000s, the industrial logging concessions in East Kutai began to decline or lapse as timber companies faced a range of financial difficulties, social conflicts, and regulatory problems. As the major logging concessions declined, small-scale clearing permits were issued and illegal logging proliferated (Obidzinski and Andrianto 2005, 46).

In the Shadow of Elephant Mountain

The Nature Conservancy, recently active in East Kalimantan, had its eye on the Muara Wahau-Kongbeng region after TNC's orangutan surveys and eco-regional assessment had identified the area as a priority for conservation. TNC initially sought to use money raised through its 'Adopt-An-Acre' program to buy out the 75,000 ha logging concession of the Gunung Gajah (Elephant Mountain) company, which was controlled by Bob Hasan, who in 2001 had been convicted of corruption and imprisoned. When news of TNC's plans leaked, however, the price of the concession shot up (TNC40 150529), and TNC was left without enough money to buy the concession. A former TNC manager recalls, "I was sitting in Bob Hasan's office, and Hasan's deputy was going to fly to jail to convince Bob to make the sale, but then they turned around and sold the concession to the illegal logging baron of East Kalimantan" (TNC41 150611). Years later,

the company was sold again to a Japanese firm, and TNC supported Gunung Gajah to attain FSC certification, which was eventually awarded in 2015. In the early 2000s, however, after its failure to purchase Gunung Gajah, TNC adopted a different strategy in East Kutai.

Building a Coalition for Wehea

TNC devoted a staff member to working full-time on East Kutai, and this staff member approached PT Loka Dwihutani, which since 1995 had managed the 38,000 ha PT Gruti III concession adjacent to Gunung Gajah. While the initial intent was to work with the company on sustainable forest management, the staffer, whom I will call Sammy, learned that the company felt the area was not good for logging and wanted to return the concession to the Ministry of Forestry.[31] Both migrants and indigenous people were also involved in substantial illegal logging within the concession at this time. When shortly thereafter the concession was revoked by the Ministry of Forestry, Sammy set about trying to protect the area so that no new logging permit would be issued. At first he attempted to pursue a designation for the former concession as a 'special purpose forest area' (*kawasan hutan tujuan khusus* – KHTK), working in cooperation with the Forestry Faculty at Mulawarman University in Samarinda. TNC also made initial contacts with Miau Baru, a community of Kayan Dayak living near the edge of the concession. The Ministry of Forestry was skeptical of the proposal, however, and there was only moderate support from the university for the plan, in part because the university already had a designated research forest and the proposed KHTK was far from the campus in Samarinda (TNC33 150423).

Sammy next began to pursue a protected forest (*hutan lindung* – HL) designation, which could be managed by the district. This effort required building a coalition within the East Kutai

[31] This account of the early stages of the Wehea program is based on my interview with 'Sammy,' TNC38 150428, as well as field notes from my visit to Wehea in April 2015.

district government. The protected forest would have to be proposed formally by the district Forestry Agency (*Dinas Kehutanan*), but in the early 2000s the Forestry Agency in East Kutai was heavily involved in logging activities and uninterested in conservation. Instead, Sammy managed to gain the support of Riza Indra Riadi, then head of the district Environmental Agency, and together they persuaded the bupati, Awang Faroek Ishak, to propose the protected forest to the Ministry of Forestry in 2004.

Around this time, a group of Dayak leaders from Muara Wahau showed up at a meeting in the district seat claiming that the forest was a part of their traditional territory and that they should be involved in the forest protection process. These leaders represented the Wehea Dayak. They were upset that TNC had approached the Miau Baru community, because the Miau had arrived only in the late 1960s, and the concession land was actually located within the customary territory of the Wehea (TNC33 150513). The Wehea had become marginalized in the region over the previous decades, and they were referred to generically and incorrectly as 'Wahau' or 'Bahau.' The leaders were looking for a way to strengthen their identity, using forest management as a linkage to the historic connection between Dayak livelihoods and the forest. Since TNC, the Wehea Dayak, and the district were all aiming to protect the forest area, they agreed to work together. The district would pursue the protected forest designation with the Ministry of Forestry, while the Dayak would manage the area through their customary institution (*Lembaga Adat*).

In November 2004, the Wehea Dayak held a customary meeting with other communities from the region, which confirmed the customary claim of the Wehea to the forest area. The Wehea declared the forest area protected and expelled illegal logging groups from the concession. In 2005, they established a program of 'forest guardians' (*Petkuq Methuey* - PM) through which men from the community, many of whom previously worked for timber companies, mines, or plantations,

spend month-long periods in the forest to protect it from logging surveyors, illegal loggers, hunters, and other encroachments. The Lembaga Adat was not interested in extracting resources from the protected forest, but rather in using forest protection to strengthen Wehea identity.[32] TNC provided financing and assistance for the Lembaga Adat and the district government to manage the forest area. Supporting the Lembaga Adat, TNC began to use the name 'Wehea' for the Dayak and the protected forest area and started to take an active role in promoting Wehea cultural identity.

There are numerous accounts of local people deploying indigenous and environmentalist discourses to attain their political goals, and of environmentalist groups allying with indigenous people to further their conservation agenda (Hirtz 2003; Tsing 2003; Dove 2006). TNC in Wehea went a step further by directly and intentionally seeking to participate in and reinforce the reconstruction of the collective identity of the Wehea Dayak people. Both current and former TNC staff and the customary head of the Wehea community relate how TNC supported the resurgence of Wehea identity. By 2005, Sammy had hired a small team, including one staff member focusing on relations with the district government and one living primarily in Sliahbing focusing on community relations. The former TNC community liaison in Sliahbing recounts, "We were encouraging Wehea identity. We developed and marketed the *Lom Plai* [harvest ceremony]. For six months, I asked them, 'What ethnicity are you?'" (trying to encourage people to respond 'Wehea' instead of 'Bahau') (TNC59 150423). The customary head of the community recalls, "People didn't used to identify as Wehea, but rather as Bahau. …We got media exposure when TNC brought in *Kompas* and *Tempo* [national media organizations], and we named the forest 'Wehea.' TNC raised our awareness" (KUTIM06 150422).

[32] There were other factions in the Wehea community, including groups that had been involved in illegal logging, that were not as supportive of the protected forest project. My focus here is on the relationship between TNC and the Lembaga Adat, while the internal politics of the community will be addressed in future work.

The Lom Plai ceremony mentioned by the community liaison is a rice harvest festival celebrated yearly in the Wehea villages. Before the cooperation with TNC, the Lom Plai was a smaller affair, and was rarely attended by outsiders. In 2006, as the customary head mentions, TNC invited media organizations to attend the Lom Plai to highlight the Wehea community, which was maintaining its traditions, including protecting the forest. The Lom Plai includes dances and prayers that had previously taken place in or around the village hall. TNC convinced the customary leader to move the dancing to the village soccer field to allow for a more public spectacle. For TNC, the promotion of Wehea cultural identity became a strategy for forest conservation. The stronger the cultural identity of the Dayak group, which is inflected with forest knowledge and livelihoods, the stronger the protection of the forest area would be. TNC also came to see this cultural dimension as an added benefit of its program. Before 2007, Sammy told me, TNC did not consider the community social value of its projects, but as Wehea was being developed, TNC began to consider social-cultural value (TNC38 150428). The Wehea helped TNC achieve its goal of conserving HL Wehea, with the added legitimacy of cooperation with a local indigenous group. On the other side, the Wehea Dayak have gained pride, recognition, and political and economic power through their cooperation with TNC and the district government and their management of HL Wehea. "Once the province, district, and community agreed to preserve the forest, the Wehea Dayak became a priority for the government also, and they get programs from the government," Sammy explained (TNC38 150428). "Wehea people's bargaining position with companies and the government has been improved;" another TNC staffer told me, "they are now seen as a community with strong *adat* (traditional customs)" (TNC33 150513). In 2013, the Ministry of Forestry finally conceded an official protected forest designation for HL Wehea, a testament to the strength of the

coalition between TNC, the district government, and the Lembaga Adat in support of the Wehea forest.

Lom Plai

I attended the Lom Plai rice harvest festival in Sliahbing in April 2015 in the company of TNC staff members, and we stayed in the house of the customary head of the community. In the years since 2006, the Lom Plai has continued to attract Indonesian journalists and media organizations, as well as local NGO staff and representatives of industrial plantation companies, who come to pay their respects to the villagers, and local and some foreign tourists. The 'outsiders with cameras,' as I will call them, of whom I was one, are often very aggressive in pursuing their best angles and shots. These paparazzi strengthen the valence of the festival as an objectified performance, against the internal meanings of the Dayak ceremonies. One component of the festival is a mock river battle, where boys standing in canoes throw reeds at each other instead of spears. As I watched from the river bank with the rest of the village, outsiders with cameras buzzed through the battle in their own canoe, snapping photos. In the afternoon, a prayer ceremony and dance takes place with traditional costumes (Figure 5.13), the component of the festival that was moved to the soccer field to create a larger spectacle. The leader of the ceremony and participants are mobbed by photo-snappers (Figure 5.14). I watched from the edge of the crowd as a group of children, unable to see much of the ceremony, became captivated by a drone being used by one of the media organizations to film the proceedings.


CV. PUTRA BELAYAN
GROUP

Figures 5.13-14: 5.13) A close-up of costumed dancers participating in a Lom Plai ceremony, and 5.14) the way the ceremony on the village soccer field actually appears; Nehas Liah Bing, East Kutai, April 2015.

Forest Guardians across the Commodity Frontier

This experience of the Lom Plai in Sliahbing leads me to a reflection on the status of 'indigeneity' and the status of 'nature' in landscapes undergoing radical transformations of capitalist globalization. The Lom Plai exemplifies a frontier of cultural commodification co-produced with the frontier of industrial deforestation. Both the indigenous culture of the Wehea Dayak and the indigenous nature of the upland rainforest are vestigial formations within the wholesale conversion of culture and landscape that has occurred in this region. The Wehea Dayak maintain their somewhat commodified culture and TNC and the Dayak and the district maintain a somewhat more commodified patch of forest, but industrial mining and plantations and industrial consumer culture have overwhelmed the landscape and the ecology of Wehea forest and Wehea culture.

As scholars of multiculturalism have argued (Mantena 2010) in parallel with scholars of the political economy of the environment (Robertson 2012), valorization happens concurrently with and enables the degradation of what is valued, in this case an indigenous cultural ecology. None of the actors in the Wehea coalition is challenging the overall development model or pretending to reduce deforestation at the level of the district or landscape. At the same time, most of the actors interested in protecting the forest are meeting their stated interests, although in a rather minimal way. There are a number of ways to read this contradiction between the 'success' of the Wehea forest and culture and the conversion of the surrounding landscape. On the one hand, we can take this contradiction as an example of 'cynical reason,' which has been theorized by Sloterdijk (1988) as 'enlightened false consciousness.' Cynical reason knows its own falsehood,

yet it "opportunistically deploys ideas and beliefs" under the lemma of 'pragmatism' (Ebert 1999). The cynical deployment of ideas and beliefs is instrumental to the reproduction of structures of extraction and exploitation antithetical to those beliefs. MacDonald uses this contradiction of cynical reason to critique neoliberal environmentalism, arguing that "environmental organizations – once the site of planning, mobilizing and implementing opposition and resistance to the environmentally destructive practices of corporate and industrial actors – have become part of a new project of accumulation grounded in enclosure, and the production and market exchange of new environmental commodities" (2013, 47). We could say that TNC cynically trumpets its success in conserving Wehea when the rest of the landscape is being destroyed, and that the customary leaders of the Wehea cynically appeal to their connection to nature in an identitarian strategy to advance their political goals. On the other hand, we can take this contradiction as an example of what I call 'Pyrrhic reason.' The power of the extractive regime in East Kutai is overwhelming, and it may well be that the only apparent alternative to these compromised victories is the complete annihilation of both Wehea culture and the Wehea forest.

These two logics are not mutually exclusive. In a landscape dominated by extraction, cynical reason and Pyrrhic reason are likely two sides of the same coin, similar in consequences regardless of differences in intent. To the degree that TNC and some members of the Wehea community are complicit in the commodification of Wehea forest and culture, they are *ipso facto* complicit in the abstraction and mystification of the real socio-ecological relations through which HL Wehea and the Wehea community are constituted, and in their simultaneous valorization and degradation within circuits of capitalist accumulation. The contrast between the (cynical or Pyrrhic) conservation of Wehea and the degradation and reduction of Kutai National Park reveals

the limited possibilities of forest conservation under a strongly extractive political-economic regime.

'Living Museums' in a Zone of Extinction

Why are there any parks in East Kutai? What is the purpose of fictitious or even real conservation of forest remnants in a world of mines and plantations? Beyond the objectives of forest conservation for the preservation of ecosystem services, protected areas may serve the interests of extractive political-economic actors in developing state capacity through territorialization (W. Adams and Hutton 2007) and enabling primitive accumulation through resource extraction and the labor of local populations (Kelly 2011; Corson 2011; Fairhead, Leach, and Scoones 2012). The designation of Kutai National Park as state land since the Dutch colonial period has helped guarantee the smooth extraction of oil and timber, and has allowed for the expropriation of settlers at the whim of the state, as in the case of the planned Sangkima airport. The designation of HL Wehea also contributed to state capacity at the district level, building up the resources of the district Environmental Agency that coordinates Wehea management. When Wehea was protected, some local people thought that TNC and the Wehea Dayak were surveying for coal in the forest area (TNC38 150428), assuming that their interest was in primitive accumulation. In Wehea, however, a coalition of conservationist actors pursued political-economic and institutional interests based not in extraction, but rather in what Brockington and Scholfield (2010) call the 'conservationist mode of production,' where accumulation operates through practices such as eco-tourism in HL Wehea, cultural tourism at the Sliahbing Lom Plai, and fundraising by TNC for its conservation programs. This conservationist mode of production still operates in Kutai National Park as well, through eco-tourism and the marketing of the park as part of East Kalimantan's 'green' image. Lastly, protected areas may facilitate the capture of material

and symbolic resources by both extractive and conservationist actors through participation in the 'world society' project of protected areas creation (Meyer et al. 1997; W. Adams and Hutton 2007), as has been the case in Indonesia through programs such as the UNDP/FAO National Parks Development Project, TNC's program at Lore Lindu in Sulawesi, and TNC's support for HL Wehea.

Protected areas creation in East Kutai has not operated within a land sparing framework, as it has in Brazil. Rather, the district is characterized by wholesale extraction in the lowlands and 'cynical' or 'Pyrrhic' conservation in the uplands. As one informant observed, "On the one hand, the East Kutai government allows Kutai National Park to be destroyed, on the other hand they support Wehea and karst because there is nothing up there anyway" (KALTIM05 140311). Paradoxically, Muara Wahau-Kongbeng has become a center of forest conservation for East Kutai, home to HL Wehea, the BOSF orangutan concession, and the FSC-certified Gunung Gajah concession, at the same time as virtually all the remaining land in the sub-districts has been leased to five different oil palm companies. The Wehea Dayak maintain their culture and a patch of forest, but they must work in the mines and plantations that have overwhelmed their landscape and the ecology of their culture. In a glimmer of ecological modernization, TNC and the Wehea Dayak have built on their experience in managing HL Wehea to form an agreement in 2014 with a local oil palm plantation operated by PT Swakarsa, a subsidiary of the DSN Group. Under this agreement, the Dayak are paid to monitor roughly 3000 ha of forest fragments conserved within the oil palm concession under the company's sustainability commitments. A group of Dayak tending forest fragments in a sea of oil palm while their families and neighbors work for the mines and plantation companies is a dim vestige of the forest and the way of life in the heart of Borneo that TNC claims to protect (TNC 2017a).

Timothy Luke, in the late 1990s, critiqued The Nature Conservancy in the US as 'the Nature Cemetery,' arguing that TNC operates by "trading sanctuary and protection here (where it is commercially possible or aesthetically imperative) to forsake sanctuary and protection there (where it is commercially unviable or aesthetically dispensable). It extracts a title for partial permanence from a constant turnover of economic destruction anchored in total impermanence. Thus the Conservancy ironically fights a perpetually losing battle, protecting rare species from what makes them rare and building sanctuary from what devastates everything on the land elsewhere with the proceeds of its members' successful capitalist despoliation" (1997, 64). This critique resonates beyond TNC to the broader political ecology of East Kutai, where the protection of HL Wehea (a remote and unproductive logging concession) has been traded for the exploitation of Kutai National Park (a rich and accessible lowland forest), and the 'partial permanence' of Dayak culture or the forests of the PT Swakarsa concession are secured only through the proceeds of the 'economic destruction' and 'capitalist despoliation' of a spectacularized Lom Plai and vast monocultures of oil palm.

During the 1990s, The Nature Conservancy as an organization moved away from its focus on a protected areas model towards an ecological modernization approach seeking conservation in 'working landscapes.' TNC's program in Wehea harkens back to its earlier strategy of "sheltering living museums of primeval [nature and culture]" (Weisman 1993). While TNC and the prevailing institutions of global forest governance have transitioned from 'cult of the wilderness' protected areas creation to eco-modernist landscape management, East Kutai is not an anachronism, or a place that has yet to progress along the 'time/development' axis of the forest transition curve. Rather, extraction in East Kutai is integrally linked with productivist modernization in the core regions where the district's resources are consumed: plywood in Japan, coal in South Korea, palm

oil in Europe. The case of East Kutai demonstrates the limits of conservation in the thrall of virtually untempered extraction, where forests survive only as living museums in a zone of extinction.

Figure 5.15: Karst escarpment on the border between Berau and East Kutai districts, seen from an oil palm plantation near Merabu village in Berau, March 2015. Karst forests offer a refuge from logging and plantations thanks to their ruggedness, though the underlying limestone is an attractive raw material for cement production.

Berau: Shifting Cultivation, Contentious Land Change, and Forest Governance

Berau, East Kutai's neighbor to the north, is in many respects the most promising district in Indonesia for reducing large-scale deforestation through forest governance. Not only is it located in East Kalimantan, the self-declared 'green province,' but Berau is also the site of a district-level REDD program that is the flagship of TNC's Indonesia Terrestrial Program and one of four

national REDD demonstration activities initially identified by the Ministry of Forestry (Masripatin 2010). Roughly 85 percent of the district remains under natural forest cover (Griscom et al. 2016), including some of the largest remaining areas of intact lowland forest in Indonesian Borneo. Berau was largely spared the massive El Niño fires that swept across East Kutai, but forest clearing associated with mining and tree fiber plantations expanded in the district in the late 1980s and 1990s and was accelerated by a boom of small-scale logging permits issued by the district at the beginning of the Reformasi period. Berau has also been a favored site for international forest conservation projects, which have operated in the district since the mid-1990s. TNC arrived in Berau at the beginning of the 2000s and focused initially on sustainable forestry projects and protected area designation. Oil palm plantations have expanded rapidly since 2005, while after 2007 TNC's focus in Berau shifted to the development of a district-level REDD program. Despite two decades of forest conservation programs in Berau and efforts with REDD to articulate a sustainable development policy framework, deforestation in the district has accelerated since 2001 (Figure 5.16), and an extractive regime continues to dominate at the district, provincial, and national levels, stymieing the weak productivist coalition promoting land sparing and 'green growth.'

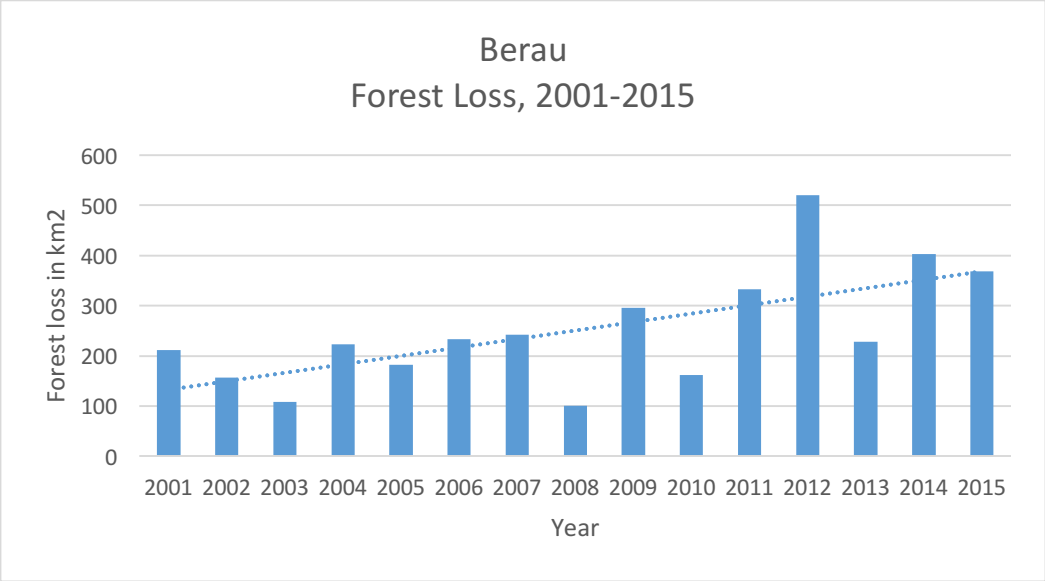


Figure 5.16: Annual forest loss in Berau, 2001-2015, at >30 percent canopy density (Hansen et al. 2013); trend line $R^2 = 0.43$.

Berau was ruled by a sultanate from the 14th century to the early 18th century, at which point the monarchy was divided under influence of the Dutch into the Sultanate of Sambaliung and the Sultanate of Gunung Tabur, whose wooden palaces lie across the river from each other in what is today Tanjung Redeb, the district seat. Coal mining in Berau began during the 1800s under the sultanates, and continued under the Dutch during the first half of the 20th century (Obidzinski and Barr 2003). Mining lapsed after Indonesian independence, and the export economy of the district next turned to timber, with the allocation of the first large-scale logging permit in the district in 1969.

Major actors in the timber sector included the government-owned PT Inhutani I, which currently controls over 300,000 ha in the district and during the 1990s controlled as much as 530,000 ha. Companies linked to Bob Hasan included the Astra Group, which controlled 140,000 ha through the concessions of PT Sumalindo Lestari Jaya, and the Kalimanis Group, which controlled over 300,000 ha of logging concessions as well as nearly 200,000 ha permitted for tree

fiber plantations in support of the group's Kiani Kertas pulp mill, which came on line in 1997 (Obidzinski and Barr 2003; Casson, Muliastra, and Obidzinski 2015). The Kiani Kertas mill was an exemplary boondoggle of Suharto's extractive regime. The mill received heavy subsidies from the Suharto government, including an allocation of $100 million from the Reforestation Fund, and there was widespread diversion of funds into private hands during mill construction. Tree fiber plantations to supply the mill also received support from the Reforestation Fund, but large areas were never planted and the concessions served instead as cover for timber extraction. The mill virtually never operated above half capacity and suffered frequent shutdowns (Obidzinski and Barr 2003; Obidzinski and Andrianto 2005). After the fall of Suharto and Bob Hasan's imprisonment, Kiani Kertas faced severe financial problems linked to the overall liabilities of the Kalimanis Group. The mill was sold in 2004 to a consortium led by military and government officials but remained paralyzed by legal and financial problems, and it is presently effectively shuttered.

The economy of Berau is today driven first and foremost by coal. Industrial coal mining resumed under PT Berau Coal in 1983 and expanded significantly during the 1990s. In 2002, mining accounted for roughly a third of the gross regional domestic product (Obidzinski and Barr 2003), and by 2014 it accounted for nearly two-thirds (BPS Kabupaten Berau 2017). A steady stream of coal barges ply the waterfront in Tanjung Redeb, and flying into the district airport, the plane approaches over a chain of open mining pits. Direct deforestation for mining is limited (Griscom et al. 2016), although indirect land use change linked to mining through mechanisms such as speculation and migration are difficult to quantify (cf. Scrivener 2013). The acceleration in deforestation in Berau since 2001 has been driven particularly by the expansion of oil palm plantations. Griscom et al. (2016) find that clearing for oil palm was responsible for 28 percent of Berau's net forest carbon emissions in 2000-2010, which includes emissions from selective

logging (degradation) as well as full deforestation. Plantation expansion increased dramatically after 2005, and by 2015 the district had 115,000 ha planted in oil palm (BPS Provinsi Kalimantan Timur 2017). Officials in the district Plantations Agency (*Dinas Perkebunan*) in 2015 reported that roughly 300,000 ha had already been permitted for oil palm, and they viewed the provincial moratorium on new permits as temporary, noting that provincial development plans had asked Berau to allocate even more area to oil palm (author field notes, 21 April 2015; TNC34 150501).

Even as the industrial frontier of timber extraction and land conversion has expanded in Berau, the district has participated in a number of high-profile international forest conservation programs. The STREK forest regeneration study began in 1989 through a collaboration with French researchers in Inhutani's Labanan concession. (Ironically, while STREK comprised one of the foremost long-term studies of tropical forest regeneration (Priyadi, Gunarso, and Kanninen 2005), parts of the STREK plots were damaged in the Reformasi logging boom after 1998 (Obidzinski and Andrianto 2005).) In 1996-2002, Berau was the site of the EU-funded Berau Forest Management Project (BFMP), which conducted forest management research and attempted to support a multi-stakeholder 'model forest' management body (Mantel 2001). BFMP even developed a concept for forest carbon trading under the nascent Clean Development Mechanism of the Kyoto Protocol (Oosterman 2000). While an Inhutani manager acknowledges that BFMP may have helped the company develop a 'social management' approach in its concessions, most actors working on forest conservation in Berau today see little impact from the project. "BFMP was a good project, there was lots of money, but it was lost," recalls an informant who has worked on forestry in Berau for over two decades, "Whatever they set up, it's not left in the field. There wasn't really ownership with Inhutani and the district government" (GIZ03 150330). "The approach of BFMP was hiring European consultants and making studies, but there was not much

impact," a former TNC staffer affirms, but he notes that TNC used BFMP's reports when they set about designing the Berau Forest Carbon Project roughly five years later (TNC35 150321).

When TNC began to work in Berau in the early 2000s, it focused initially on sustainable forest management and protected areas creation. PT Sumalindo Lestari Jaya (SLJ), part of Bob Hasan's Astra Group, held the 100,000 ha SLJ IV concession in the upper Segah River watershed in western Berau, overlapping the territories of five indigenous Dayak villages. The communities became upset that the company had blocked a small river used by villagers, violated village grave sites, and cut down fruit and honey trees, and they felt they were not receiving substantive benefits from the logging operations (Lalasz 2009; Lobet 2010; BER16 150418). Tensions escalated to the point where villagers seized SLJ logging equipment and managed to halt logging in the concession for nearly three years, in 2000-2003. In 2002, SLJ approached TNC in Berau, seeking an 'honest broker' to help negotiate with the communities. Two years of negotiations produced an agreement between the company, the five communities, and the district government under which the company would respect sacred sites, provide scholarships and infrastructure, and pay increased volume-based fees on timber extraction to the communities. SLJ was sold in 2003 to the Hasco Group, the agreement held, and logging resumed. TNC helped the communities form an association, known as BP Segah, which manages the relationship with SLJ under a model that TNC has dubbed 'collaborative forest management.' Communities now largely support the company's presence and assist in monitoring the concession, as they will not allow entry by illegal loggers who would effectively be stealing from the communities as well as from SLJ (BER16 150418; TNC37 150421). SLJ is now pursuing FSC certification for the concession, although the concession currently measures just over 60,000 ha, since a third of its area has been excised for oil palm.

After its success with BP Segah, TNC replicated the collaborative forest management approach in the Kelay watershed, the other major upland watershed in Berau. The Upper Kelay Village Forum today manages relations between Kelay Dayak communities and four different logging concessions overlapping village territories. Kelay is also the site of the Lesan River Protected Forest (HL Lesan), an area of roughly 11,000 ha overlapping four different villages. With support from TNC, the district Forestry Agency, and the communities, Lesan was designated by the bupati in 2004 as a protected forest area to conserve orangutan habitat and protect the regional hydrology (BER02 150317; BER09 150413). The protected forest designation was finally confirmed by the Ministry of Forestry in 2014. While HL Lesan was established at the same time as HL Wehea, and under a similar model of engaging communities and districts to establish protected areas locally, there were village boundary and land disputes between two of the Lesan villages, and TNC had greater difficulty coordinating community management. There was also a lack of budgetary support for the protected forest from the district (TNC33 150513). The forest eventually came to be managed within the Berau Forest Management Unit (KPH), established in 2010 as part of a national effort to promote more decentralized and integrated forest management. Although HL Lesan covers a relatively modest area and has not benefited from the same level of community, NGO, and district commitment as HL Wehea, Lesan is nonetheless mentioned by numerous informants as an example of successful forest conservation in Berau. This emphasis on Lesan demonstrates again the symbolic, if perhaps cynical or Pyrrhic, conservation value of protected areas in an otherwise extractive landscape: Lesan is bordered on the east and south by oil palm plantations and on the west by the trans-Kalimantan highway.

When the 2007 Bali Climate Conference touched off a new wave of REDD programs, TNC decided to build on its presence in Berau to launch a REDD pilot program in the district. TNC

formed working groups with partners including the Ministry of Forestry, an Indonesian NGO, an environmental consultancy, and the World Agroforestry Centre (ICRAF) to develop the technical aspects of the Berau Forest Carbon Program (BFCP). As a number of informants noted, the commitment of the district government to BFCP was never more than lukewarm. Makmur, the bupati of Berau from 2005-2015, was opposed to carbon trading because of the failure of a previous attempt to develop a Clean Development Mechanism forest project in Berau, but TNC promoted REDD to the bupati as a way of improving district forest governance (TNC35 150321) and eventually secured his assent, if not enthusiastic support. In the words of a former TNC staff member, "TNC went deep in Berau, but never had clear champions there" (TNC41 150611). The plan initially called for BFCP to be funded by a multi-donor trust fund (MDTF) and overseen by a steering committee, with TNC participating as a donor and steering committee member. TNC was unable to attract donors for an MDTF, however, so "TNC now had a big design and no money and had to change the implementation concept" (TNC42 150709). Thus, around 2009, TNC decided to "put all its eggs in the Berau basket" (TNC29 141223) and go "all in on REDD and Berau" (TNC41 150611), reallocating resources to the district and attracting donors to support particular programs. Funding for BFCP has subsequently come from sources including the Anne Ray Charitable Trust (created by Cargill heiress Margaret A. Cargill), the Bank of America Foundation, the Grantham Foundation (Jeremy Grantham sits on the TNC Board of Directors), the Norwegian Government, the Boeing Foundation, and Xerox.

TNC proceeded to develop its program in Berau in five key areas, comprising a combination of site-based activities and work on 'enabling conditions' for REDD (TNC34 150316). Activities related to enabling conditions have concentrated on building the jurisdictional REDD program, and include carbon accounting and support for the development of a 'reference

emission level' for the district, support for the district REDD working group and BFCP Steering Committee, and engagement with government policy and planning processes. The other four areas of the program focus on endangered species (particularly orangutan), protected areas, corporate engagement (especially with logging concessions), and community-based natural resource management. While work in these areas also includes activities related to enabling conditions, such as TNC's research and experimentation with reduced-impact logging methods (Griscom, Ellis, and Putz 2014; Ellis et al. 2016), the bulk of activities have been site-based. TNC work on protected areas and orangutan conservation in Berau includes the HL Lesan project and initiatives related to the Sangkulirang karst. Engagement with logging concessions includes support for concessions pursuing FSC certification and for collaborative forest management with the Segah and Kelay communities. Finally, community-based natural resource management has involved intensive work with two model villages, on the basis of which TNC has developed a methodology for community engagement in REDD called SIGAP-REDD+[33] (Hartanto, Yulianto, and Hidayat 2014).

Alongside its own heavy investment in BFCP, TNC successfully encouraged Germany's bilateral cooperation programs (GIZ and KfW) to select Berau as one of the target districts for their Forests and Climate Change Programme (FORCLIME). FORCLIME, like TNC, aims to develop REDD readiness and demonstration activities, although its field activities operate only in western Berau, whereas TNC takes a "wall-to-wall REDD" jurisdictional approach (GIZ05 150427). FORCLIME began work in Berau around 2010, supporting activities including capacity development for the Berau Forest Management Unit within the district Forestry Agency,

[33] SIGAP-REDD+ is an acronym for *Aksi Inspiratif Warga untuk Perubahan dalam REDD+*, or Inspirational Popular Action for Change within REDD+.

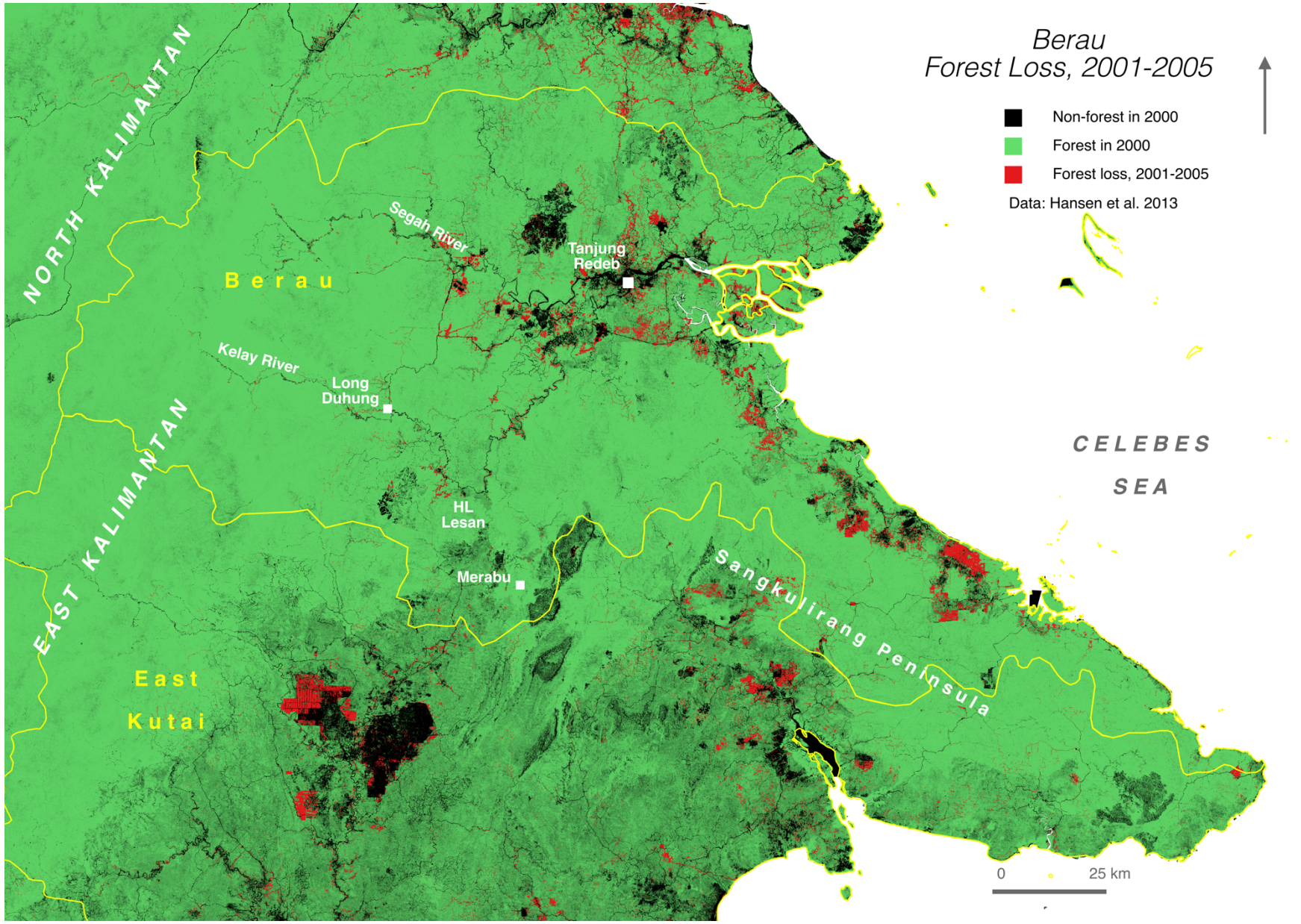
sustainable logging practices and FSC certification in the SLJ IV concession, studies for identification of a district reference emission level, and alternative livelihood development with villages in the SLJ IV and Inhutani I Labanan timber concessions. A substantial portion of FORCLIME activities are run 'on-budget' directly through the Ministry of Environment and Forestry, which a former employee notes makes FORCLIME administration slower than TNC activities, but improves coordination with the government (GIZ06 150427).

FORCLIME began implementing demonstration activities in villages in 2013-2014, selecting villages so as not to overlap with TNC's ongoing activities. Demonstration activities are intended to promote alternative livelihood practices that will allow communities to reduce clearing for shifting cultivation. FORCLIME's strategy in the villages, like TNC's, is to encourage village land use intensification by promoting agroforestry and more intensified rice production (GIZ03 150330), though the initial approach has been to make "easy and quick investments to raise confidence" (GIZ06 150427) and the long-term strategy for village land use may be less clear (GIZ03 150330), leading one TNC employee to the characterization that "FORCLIME had no plan [for community development], they just ran around to villages handing out $25,000 here and there" (TNC42 150709).

TNC's community strategy, meanwhile, packaged as SIGAP-REDD+, was leveraged by the organization to secure funding for BFCP within a US Government Tropical Forest Conservation Act (TFCA) debt-for-nature swap. TFCA is run through the US Treasury and USAID, and initially focused on protected areas. Around 2009, however, Treasury personnel were interested in incorporating climate change issues into the program and contributing to REDD (TNC50 150813). TNC pitched its SIGAP approach and managed to forge an agreement with WWF to manage the TFCA program in Kalimantan, with TNC focused on implementation in

Berau and WWF focused on Kutai Barat in East Kalimantan and Kapuas Hulu in West Kalimantan, where it has ongoing programs. Through TFCA, TNC managed to secure $10 million for BFCP for 2013-2017, which it is using to fund local organizations to replicate SIGAP-REDD+ in villages across Berau. As of April 2015, twelve local organizations were receiving TFCA funding in Berau. SIGAP is based on the experiences of two model villages where TNC piloted community REDD strategies. A primary strategy for reducing village-level deforestation in these models has been the reduction in agricultural clearing through shifting cultivation (swidden) in favor of more intensive land use strategies, including limitation of swidden to previously cleared areas and the establishment of permanent rubber gardens. These models thus deploy a land sparing logic at the village level, linking swidden and agroforestry intensification to deforestation reductions. A similar village-level land sparing logic informs FORCLIME's community demonstration activities and comprises one of the recommended strategies for local NGOs implementing TFCA projects (TFCA, n.d., 23). The following sections explore this village-level land sparing project and analyze why control of shifting cultivation has become one of the primary strategies for organizations working on forest governance in Berau.

Figures 5.17-18: 5.17) Map of Berau showing forest loss in 2001-2005; 5.18) Map of Berau showing forest loss in 2001-2014, demonstrating large-scale deforestation after 2005.


Berau
Forest Loss, 2001-2005
Non-forest in 2000
Forest in 2000
Forest loss, 2001-2005
Data: Hansen et al. 2013
NORTH KALIMANTAN
EAST KALIMANTAN
Berau
East
Kutai
Segah River
Tanjung
Redeb
Kelay River
Long
Duhung
HL
Lesan
Merabu
Sangkulirang Peninsula
CELEBES
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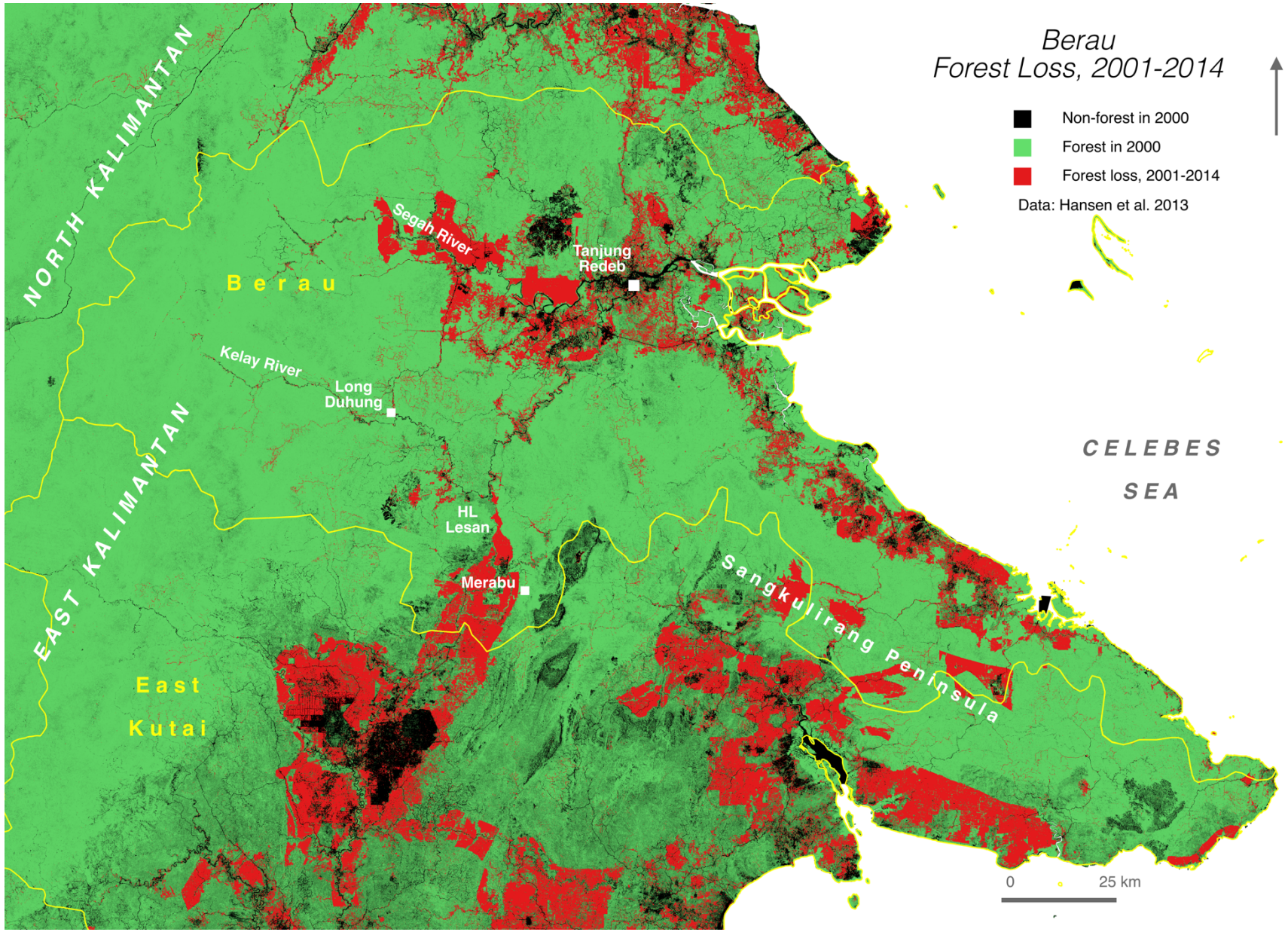
Berau
Forest Loss, 2001-2014
Non-forest in 2000
Forest in 2000
Forest loss, 2001-2014
Data: Hansen et al. 2013
NORTH KALIMANTAN
EAST KALIMANTAN
Berau
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Kutai
Segah River
Tanjung
Redeb
Kelay River
Long
Duhung
HL
Lesan
Merabu
Sangkulirang Peninsula
CELEBES
SEA
0
25 km

Shifting Cultivation and Forest Conservation[34]

Swidden, or shifting cultivation with fire (O. Mertz et al. 2009), has for centuries been a dominant component of the agricultural systems of upland Southeast Asia. For almost as long, swidden systems have been under pressure from external actors, including governments, companies, and conservation groups, who have sought to control or eliminate shifting cultivation (Scott 2009). The transformation of Southeast Asian swidden systems in recent decades has been especially intense, with widespread extinction or alteration of swidden practices due to a confluence of political, economic, and ecological factors, including government resettlement and land privatization policies, infrastructure expansion, environmental conservation initiatives, and the landscape-scale expansion of industrial agriculture (Padoch et al. 2007; Fox et al. 2009). I conducted field visits in March-April 2015 to the two upland Dayak villages where TNC pioneered its SIGAP approach in order to investigate the relation between forest governance programs and village land use change. I combined this fieldwork with both internal and publicly-available documents from TNC and government agencies, key-informant interviews, media reports, and data from household surveys carried out in 2012 and 2014 by CIFOR's Global Comparative Study on REDD+.[35]

I find that at the household level, swidden clearing has become increasingly important as a strategy for villagers to assert control over land under conditions of tenure insecurity (cf. Peluso 2005). Political-economic dynamics of territorialization and speculation shape swidden systems through a form of 'contentious land change' (Aldrich et al. 2012). At the village and district levels,

[34] The following sections on swidden and forest governance in Berau draw on material that has appeared in publication in Thaler and Anandi (2017), "Shifting cultivation, contentious land change and forest governance: the politics of swidden in East Kalimantan."

[35] I am indebted to Cut Augusta Mindry Anandi, who coordinated CIFOR data collection in Berau and who collaborated with me in my analysis of the villages.

I find that forest governance has coalesced around land sparing swidden control because compensated reductions in swidden can reconcile community livelihoods with industrial forestry and government development priorities. The concentration of village forest governance on swidden systems has had ambivalent effects, however, developing village land management and livelihood activities at a cost of temporary increases in swidden clearing and with minimal impact on larger-scale deforestation for industrial land uses such as oil palm and tree fiber plantations and coal mining. These findings lead me to conclude that forest governance efforts in Berau have thus far been ineffective in eliminating contentious land change or reducing district-level deforestation due to their incapacity to address extractive plantation and mining expansion as the dominant direct and indirect drivers of forest conversion.

Swidden in East Kalimantan

In Borneo, as in much of the rest of Southeast Asia, swidden systems are centered on upland rice production. In the classic model, a forested area of roughly 1 ha is selected for cultivation and trees and brush are felled and then burned to enhance soil fertility. The swidden plot (called *ladang* in Indonesian[36]) is cultivated in rice for one or several years, often intercropped with or succeeded by other useful species such as chili, cassava, or banana, and the plot is then fallowed for a period of usually not less than five years. Often, fruit trees and hardwoods are tended in the fallows. When sufficient time has passed to restore fertility and reduce the population of weeds and agricultural pests, the plot may again be cleared and returned to cultivation.[37] Swidden plots and fallows are traditionally controlled by the household that originally cultivated them, or by descendants of the

[36] The Indonesian word 'ladang' is widely used and understood, while terms for swidden plots in local dialects differ.

[37] A classic description of an upland rice swidden system is Conklin's (1957) work on Hanunóo agriculture in the Philippines. Descriptions of swidden systems in eastern Indonesian Borneo include Inoue and Lahjie (1990), Jessup (1991), Colfer and Dudley (1993), and Colfer (2008).

original cultivators. This swidden model has historically been practiced by settled upland groups, who would engage in trade with hunter-gatherer Punan and with coastal populations.

Particularly since the end of World War II, this swidden system has been circumscribed, disrupted, and otherwise transformed by a variety of political and economic forces. Central to this transformation has been the assertion of state control over most of the land in Kalimantan through the creation of the national forest estate, followed by commercial logging and 'development' schemes facilitated by the relocation and sedentarization of indigenous groups and state-sponsored transmigration of non-indigenous settlers (Li 1999; Peluso 2005; Colfer 2008). In response to state and market pressures and incentives and the encroachment of logging companies and migrants, most hunter-gatherer groups have become more sedentary, usually taking up shifting cultivation and other agriculturalist livelihood practices (Sitorus et al. 2004). Indigenous agriculturalist communities have responded to shifting political and economic incentives in a variety of ways, including through expanded production of cash crops such as rubber (Dove 1993) and pursuit of off-farm employment with timber companies. The rapid expansion of oil palm plantations across East Kalimantan in the last two decades has dramatically altered the upland landscape, and many Dayak now also cultivate oil palm or work as laborers on oil palm plantations.

Model Villages in the Berau Forest Carbon Program

The Dayak villages of Merabu and Long Duhung are located in the Kelay watershed of western Berau. The 56 households of Merabu consist primarily of Dayak Lebbo, and the village has been on its current site for several generations. The village is abutted by a timber concession, an oil palm plantation, and a protected forest area covering a karstic limestone escarpment, as well as by neighboring villages to the north and west. Merabu has only been accessible by road since 2012, when company access roads reached the settlement. The roughly 35 households of Long

Duhung are predominantly Dayak Punan, who until recently were semi-nomadic and have traditionally relied heavily on hunting and gathering. The village has moved several times in the past decades, most recently from one side of the river to the other in order to avoid flooding and to have better access to a logging road. Long Duhung is abutted by timber concessions, as well as by upriver and downriver villages and a neighboring inland village of Dayak Kenyah, who settled in the area around 2008. For the purposes of my argument, the villages offer a contrast between a landscape of timber concessions with smallholder agriculture (Long Duhung) and a landscape undergoing conversion for plantations and mining (Merabu).

Swidden in both Long Duhung and Merabu conforms to many of the patterns described in the broader literature. Especially in Merabu, however, swidden is playing a critical political role as a form of establishing land claims and control for villagers who feel pressured by competing land uses driven directly and indirectly by the plantation and mining sectors. Rapid expansion of mining and oil palm concessions heightens perceptions of tenure insecurity among villagers, leading to speculative and contentious land clearing.[38]

Both villages also participate in forest governance programs with The Nature Conservancy. Under the community-based natural resource management component of BFCP, TNC has targeted Long Duhung and Merabu as pilot villages, and limiting forest clearing for swidden has been one component of village-level activities. The villages were selected after an evaluation of 20 villages in Berau based on criteria including reasonable accessibility for TNC staff, substantial remaining forest cover, and positive community interest. Long Duhung and Merabu were chosen in part to provide a contrast between working with timber concessions (Long Duhung) and working with

[38] While contentious land change in swidden systems has received little attention, much has been written elsewhere on the relationship between insecure land tenure and deforestation. See for example Deacon (1994), Alston, Libecap, and Mueller (1999), Geist and Lambin (2002), and Margulis (2004).

protected forest area (Merabu), according to a TNC manager (TNC33 150318). BFCP has so far generally failed to engage the major corporate actors involved in deforestation and has struggled with lukewarm commitment from the government, yet the projects in Merabu and Long Duhung have been successful in constructing multi-stakeholder collaboration. I explore how and why the limitation of swidden has become a focus for development of forest governance. I first describe the swidden systems in Long Duhung and Merabu, focusing especially on the political dimension of household decision-making regarding swidden clearing in Merabu. I then examine village and district-level swidden politics under recent forest governance initiatives.

Swidden in Long Duhung and Merabu

Long Duhung

The Dayak Punan of Long Duhung previously depended on sago as a dietary staple, though as they have become more sedentary over the past several decades their diet has shifted to hill rice, with sago rarely consumed outside of ceremonial occasions.[39] Elders still speak of a time 'before rice,' but today the villagers are primarily swidden rice farmers. A 2013 report for TNC prepared by the French Institute for Sustainable Development and International Relations (IDDRI) found that 77 percent of villagers farm swiddens, and for 61 percent of villagers it was their primary livelihood activity. The most common secondary livelihood source was artisanal gold mining, which provided income for over half of village households (Pirard and Lapeyre 2013). In the swidden cycle, villagers say they would not return to a fallow plot for a minimum of five years, and they prefer at least a seven-year fallow. The CIFOR survey found that between 2010-2012 and 2012-2014 the percentage of households clearing forest remained constant at around 75 percent, and these households cleared an average of 1 ha/year in the first period, decreasing to 0.6 ha/year

[39] Unless otherwise cited, details in this section on Long Duhung come from author field notes, April 2015.

in the second. In both periods, clearing for ladang occurs primarily in 'natural' (mature) forest area (i.e., mature old-growth forest or advanced secondary succession), as opposed to in more recent fallows (Anandi et al. 2014, 373), resulting in expansion of the total agricultural area of the village. In the longer term, the IDDRI report describes a trajectory of expanding swidden area in Long Duhung, from roughly five plots total per household in 2003 (including both fallows and actively cultivated fields) to eight plots per household in 2013, with villagers anticipating further expansion to 11 plots per household by 2023. Part of the reason for this expansionary dynamic in the Long Duhung swidden system is the relatively recent establishment of the village in its current location. Villagers are opening ladang for yearly rice production, but also with a view to establishing fruit groves and rubber or cacao gardens, which are longer-term land uses they have not yet fully developed in their current area. Indeed, the IDDRI study finds villagers anticipate a fourfold expansion of their tree gardens over the coming decade. Villagers also seek to expand the land base under their control as a legacy to their descendants.

While the village is located within logging concessions, the logging companies do not operate within a 1-2 km radius of the village, and they respect the villagers' right to clear swidden areas. There are some boundary conflicts with neighboring villages, particularly the inland village of recent Kenyah migrants, but these conflicts generally do not appear to affect the Long Duhung villagers' swidden areas. Swidden plots are usually located along the river or on the logging road leading to the village. The Kenyah village is located on the road rather far from Long Duhung, so conflicts pertain to hunting or illegal clearing by the Kenyah in the Long Duhung forest area, but occur beyond the radius of Long Duhung swidden land. While logging activities around Long Duhung are not driving the villagers to engage in territorializing or speculative clearing, the conflicts with the Kenyah represent an indirect effect of plantation expansion, since the Kenyah

emigrated from the village of Long Segar in neighboring East Kutai district due in part to land conflicts caused by oil palm concessions (cf. Elmhirst, Siscawati, and Colfer, n.d.).

Table 5.1: Swidden Agriculture in Long Duhung and Merabu

	Long Duhung	Merabu
Agriculture as primary livelihood activity, % of households[a]	61	50
Agriculture as secondary livelihood activity, % of households[a]	16	23
Area of natural forest cleared, ha/household/year (average), 2010-2012[b,c]	1.0	0.9
Area of natural forest cleared, ha/household/year (average), 2012-2014[b,c]	0.6	0.6
Number of ladang plots/household (average), 2003-2004[a,d]	4.8	3.1
Number of ladang plots/household (average), 2013[a,d]	7.8	3.6
Number of ladang plots/household (average), 2023 (estimate)[a,d]	10.9	4.3

[a] Pirard and Lapeyre (2013), [b] Data from CIFOR Global Comparative Study on REDD+, Module 2 on Subnational Initiatives, [c] average among households reporting any forest clearing, [d] total of both fallows and actively cultivated plots

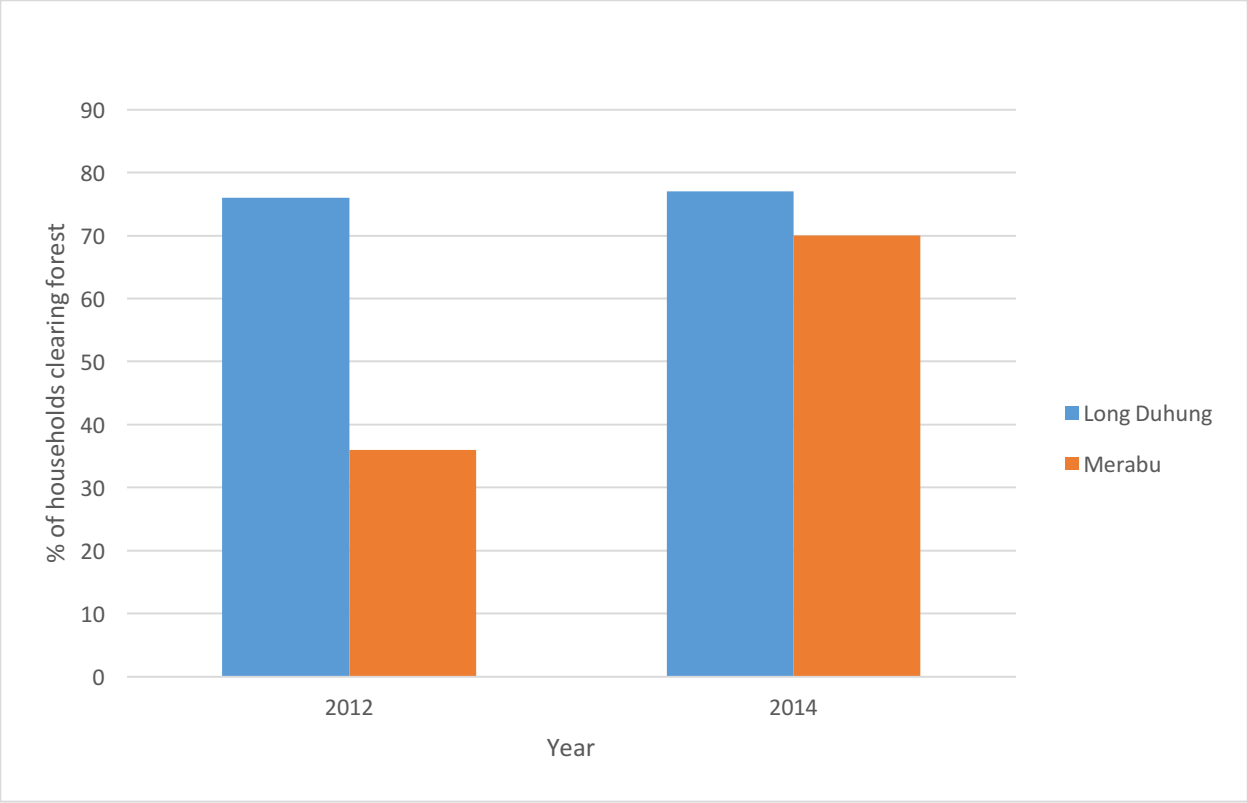
Merabu

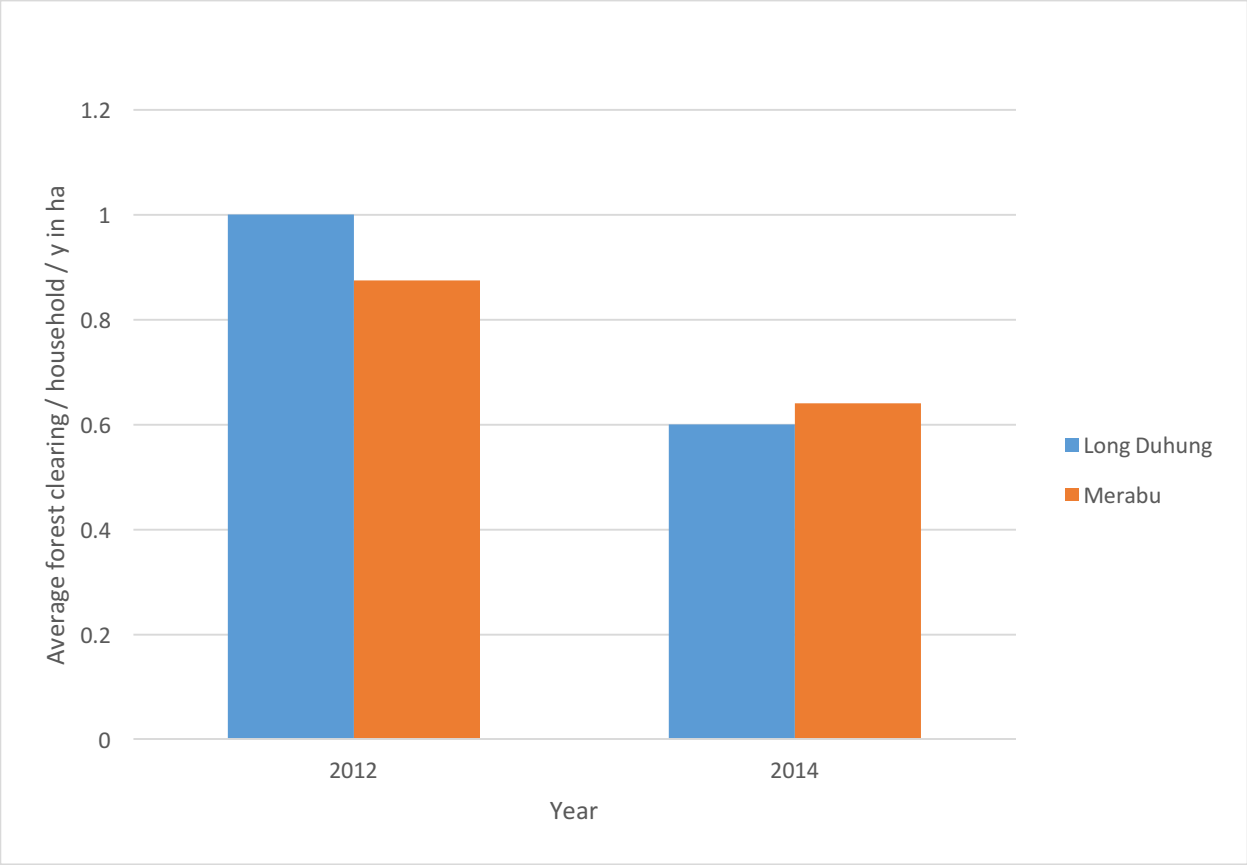
Merabu[40] village has been in its current location for several generations and is surrounded by a more diverse mosaic of land uses than Long Duhung, resulting in substantially different swidden dynamics. Merabu villagers have overall more diversified livelihood strategies than villagers in Long Duhung. The IDDRI study, while only managing to survey 60 percent of Merabu households, found that while 73 percent of households still farmed ladang, it was the primary livelihood activity for just 50 percent of them. Harvesting edible birds' nests, either individually or as a worker for the private company PT Walesta, which holds a concession to caves in the

[40] Unless otherwise cited, details in this section on Merabu come from author field notes, March 2015.

nearby karst escarpment, provided income for 44 percent of households. Residents may also work for the logging company, and they are widely known for harvesting large amounts of forest honey.

Residents of Merabu have historically tended to clear less ladang area than villagers in Long Duhung. IDDRI data show that while in 2003, Merabu villagers usually planted around 0.8 ha/year, in 2013 they were planting only 0.6 ha. Merabu villagers also had comparatively fewer total (cultivated and fallow) swidden plots, an average of 3.6 in 2013, which they expected to grow only modestly over the following decade to an average of 4.3, according to IDDRI. Merabu villagers have received government and TNC support to plant rubber trees, and IDDRI found that most villagers had at least one tree garden and expected to add several more in the coming decade. The more limited practice of swidden in Merabu is explained in part by the longer presence of the village in its current location (meaning households have had time to build up a land bank for non-swidden land uses such as fruit groves), and in part also by the greater reliance on tree crop and non-agricultural livelihood sources relative to Long Duhung, where villagers are more dependent on swiddens for subsistence. In recent years, total clearing in Merabu has increased, however. CIFOR data show that while in 2010-2012 only 36 percent of surveyed households cleared forest area, in 2012-2014 that figure jumped to 70 percent. The average annual clearing per household declined slightly, similar to in Long Duhung, from 0.9 ha in 2010-2012 to 0.6 ha in 2012-2014. These recent changes result from a combination of governance incentives and contentious land change processes, and are discussed further in the following sections.


90
80
70
60
50
40
30
20
10
0
% of households clearing forest
2012
2014
Year
Long Duhung
Merabu


1.2
1
0.8
0.6
0.4
0.2
0
Average forest clearing / household / y in ha
2012
2014
Year
Long Duhung
Merabu

Figures 5.19-20: 5.19) Households clearing forest in previous two years; 5.20) Average annual forest clearing per household of households clearing forest in previous two years.

As in Long Duhung, villagers in Merabu still cleared almost exclusively mature forest areas when opening new ladang in 2010-2014, as opposed to returning to recent fallows. One villager stated succinctly the logic, saying, "We prefer to open ladang in forested areas because it's more fertile and we get new land." Returning to fallows is cheaper, but then they often experience problems with weeds, and they lose the chance to establish possession over a new area. Many fallows have also been planted with fruit trees, which villagers prefer not to fell. The desire to establish rights over new land through swidden clearing is motivated in Long Duhung by the need to establish a land bank for planting fruit groves and providing a legacy for future generations. In Merabu, however, swidden is a relatively smaller component of the livelihood strategies of most households and the area cultivated through swidden has been and is expected to remain fairly stable. Villagers anticipate expanding their area of tree crops, especially rubber, which is one motivation for opening new land, but there are two other important, non-agronomic motivations: the use of swidden to establish territorial control for the village, and the use of swidden to establish private land rights as a form of economic speculation.

Swidden as a form of territorial control is used to counter competing claims and encroachment by neighboring villages. Merabu villagers have ongoing boundary disputes with Merapun, the Dayak Lebbo village downriver from Merabu. Encroachment by Merapun villagers has been exacerbated by the establishment of an oil palm plantation surrounding Merapun village, which has limited Merapun's forest area at the same time as new roads have enhanced access to Merabu territory, making inter-village land conflict an indirect effect of oil palm expansion. Merabu villagers may choose to open swiddens in contested areas in order to establish territorial control for their village. At the same time, both Merapun and Merabu villagers have private

speculative interests in opening ladang in contested areas because of the expectation that an oil palm concession may be issued and villagers whose ladang fall within the concession would be able to make claims for compensation. Similar speculative clearing by Merabu villagers is said to have occurred in response to a coal company survey, as villagers sought to position themselves to gain compensation from any land that would eventually be taken over by a mine.

Household Decision-Making: Contentious Land Change in a Swidden System

The strategic use of swidden as a form of land control has received relatively little attention in the literature on drivers of change in swidden systems. It receives no direct mention, for example, in van Vliet et al.'s (2012) meta-analysis of 111 publications. While in Dayak communities, swidden clearing confers land rights under customary law, tree crops such as rubber and cacao have historically been more likely than swidden to be recognized as denoting a land claim, especially by Indonesian authorities or private companies (Dove 1993, 142). In recent years, however, government and corporate actors have increasingly recognized managed swidden fallows (i.e., fallows within a certain radius of a village and marked with hardwood or fruit trees) as village property, even as these same actors have sought to restrict the practice of swidden overall. The possibility of external recognition increases the salience of land control considerations for villagers in locating swidden plots. The case of Merabu highlights two separate land control functions of swidden – territorialization and speculation – that help determine both the location of swidden plots and the continued expansion of swidden into new forest areas.

The territorializing function of swidden presents a paradox, or 'problem of composition,' since rights to a swidden plot are customarily held by the household that cultivates it, yet that household also belongs to a village, and so its plot may be considered a marker of village territory (cf. Dove 1983). Most villages in Berau do not have official territorial boundaries demarcated by

the government. The village as a formal administrative unit with defined cartographic boundaries only began to be imposed in Kalimantan in the last 35 years (Peluso 2005), and much more recently in upland East Kalimantan (Colfer, pers. comm.). Rather, multiple institutional layers define overlapping boundaries that are negotiated and contested among communities, concessionaires, and government agencies. In the absence of formally-demarcated cartographic boundaries and under conditions of rapid landscape change driven by migration and industrial expansion, possession may be 'nine-tenths of the law,' in that the occupation of an area through swidden clearing and the subsequent planting of hardwoods or fruit trees by a household may serve to reinforce village territorial claims that are contested across government and company boundaries, NGO land use plans, and customary areas. These claims are important not just for determining the spaces for villagers to carry out their livelihood activities, but also for determining collective payments made by companies operating in the village territory.

The speculative function of swidden is a response to the rapid and poorly regulated expansion of industrial land uses around Merabu. Most of the landscape falls within the forest estate, whose management is under the authority of the central government's Ministry of Forestry, while even in lands outside the forest estate there is rarely any formal recognition of community land uses (Contreras-Hermosilla and Fay 2005; Rights and Resources Initiative 2015). The resulting tenure insecurity means communities have few options for resisting the conversion of village territory to mines or plantations (Myers and Ardiansyah 2014). In addition to providing collective payments or subsidies to communities that fall within their footprint, companies may also directly compensate households whose ladang or tree gardens are taken by a concession. Compensation practices vary, but in the case of oil palm plantations, compensation most often takes the form of certificates that entitle a household to revenue from the production of 1 or 2 ha

of plantation land. Companies deduct costs related to planting and management of the areas, so during the first five to six years a household holding a certificate may expect to receive IDR 100,000-300,000/month.[41] In circumstances where not all households in a village receive certificates, those whose swidden lands have been taken by the company may be able to make stronger claims to the company or village elites in order to receive compensation. Facing the possibility of expropriation of lands within the village territory, and uncertain of how compensation may be administered, villagers speculate on future company activities by locating swidden in possible concession areas to establish personal land claims that will enhance their prospects for compensation when the lands are expropriated.[42]

The expansion of swidden as a land control strategy for territorialization and speculation represents a form of contentious land change within an extractive political-economic regime. Aldrich et al. (2012), working in the Amazon, argue that while land change science typically analyzes land cover change as the result of decisions made by individual rational actors, a more complete understanding of land change recognizes its social nature. They assert that "a component of deforestation in Amazônia results from contentious social interactions aimed at land possession in addition to what we refer to as *agronomic* deforestation undertaken to plant crops or pasture as an economic activity" (109, original emphasis). Any individual land clearing decision will typically combine both social and agronomic considerations. Nonetheless, the recent development of a village spatial plan under TNC's project in Merabu allows for the identification of specific ladang plots as examples of land use change predominantly determined by contentious processes.

[41] This sum is not insignificant, considering the national poverty line is set at just over IDR 300,000/person/month.
[42] In Merabu, speculation is evident through the location of swidden clearing, not the total amount of clearing by a household. Households are still clearing and planting plots of roughly 1 ha, but in some cases they are siting these plots strategically based in part on possible future compensation. Household resources for clearing and planting to establish land claims are limited, so runaway speculation involving larger-scale clearing has not been observed.

These clearings are explored in more detail in the following section, which examines the transformation of the swidden systems of Long Duhung and Merabu through the evolution of new structures of forest governance.

Village and District-Level Forest Governance

The Nature Conservancy's Conditional Payments Agreements

After launching BFCP with the district government in 2009, TNC began to look for ways to integrate communities into REDD (I. Moeliono et al. 2010), including piloting incentives schemes that would compensate villagers for emissions reductions (Pirard and Lapeyre 2013). After a participatory planning period, both Merabu and Long Duhung signed agreements in late 2013 declaring their participation in BFCP and their commitment to protecting the forest and promoting environmentally-friendly livelihood activities. In Long Duhung, the bupati attended the signing, opening the ceremony by planting a rubber tree (*Karbonhutanberau.org* 2013). In Merabu, a plaque and totem were installed in the center of the village to commemorate the village's commitment to "preserve the forest, conduct spatial and land use planning, and fight for prosperous living" (Figure 5.21).

Figure 5.21: Plaque and Totem Commemorating Merabu Village Agreement, 18 March 2015.

The village declarations were accompanied by Conditional Grant Agreements with TNC. Under these agreements, villagers' performance in meeting specified targets during the first year of the contract would determine the level of support provided by TNC in the subsequent year, with support reduced in case of failure to meet targets. The initial TNC grant to the communities, IDR 239 million each (about $20,000), included support for forest patrols and forest management, rubber cultivation, chicken raising, vegetable gardening, honey production, fish farming, and capacity building, among other activities. In exchange, villagers agreed to "strengthening the enabling conditions" and "[climate change] mitigation and management of natural resources"

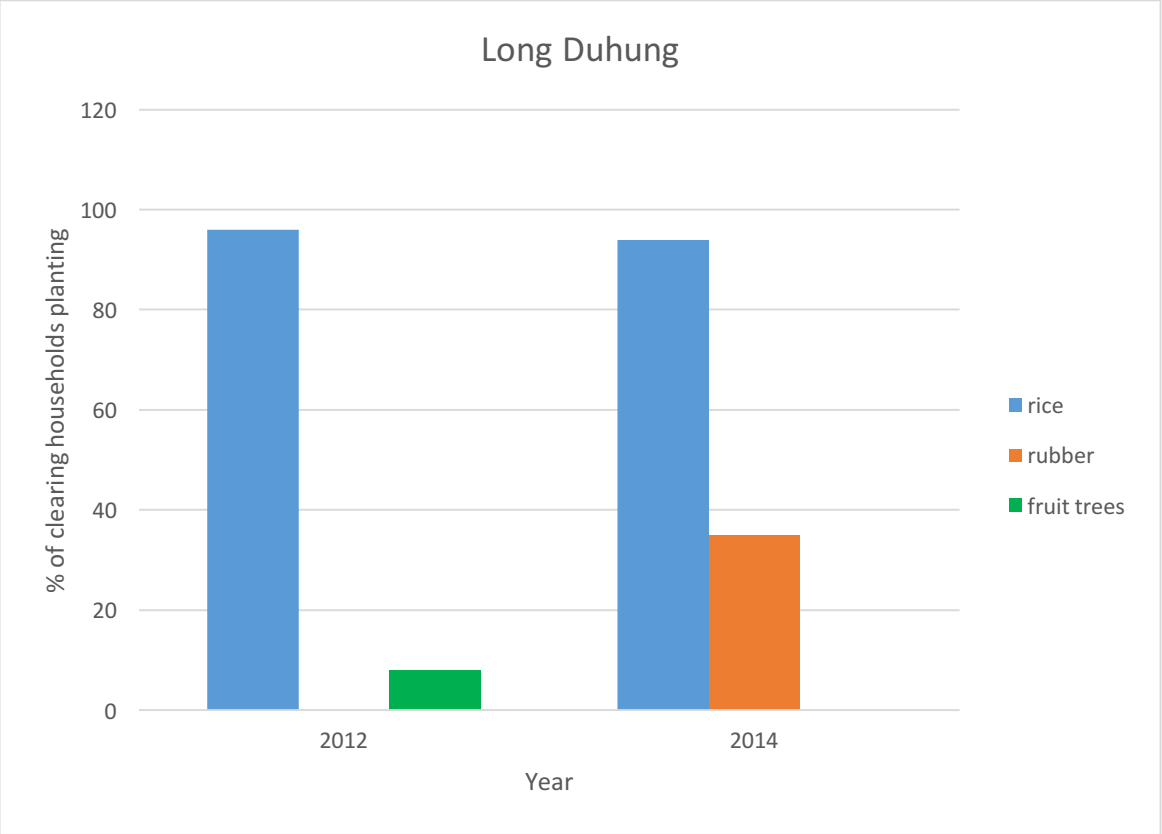
(TNC-Indonesia, n.d.). Activities under enabling conditions generally relate to village financial management and capacity building. Under mitigation and management, villagers agreed to carry out forest patrols and biodiversity and ecotourism surveys, and to limit their practice of shifting cultivation. Villagers agreed to open not more than 1 ha/household/year of ladang, and only to open ladang in fallows as opposed to in new forest areas. New forest areas could be opened exceptionally in the case of new households that had not yet established a land base. In Merabu, villagers committed to a maximum of four ladang plots per household (active or fallowed), for a total of 4 ha of swidden land each ("Kesepakatan Dan Komitmen Masyarakat Kampung Merabu" 2013). In Long Duhung, the community agreed to a maximum of seven ladang per household (active or fallowed), totaling 7 ha of swidden land. Additionally, TNC assisted each village in the development of a village land use plan, specifying areas for settlement, swidden farming, rubber gardens, agroforestry, and reserve land.

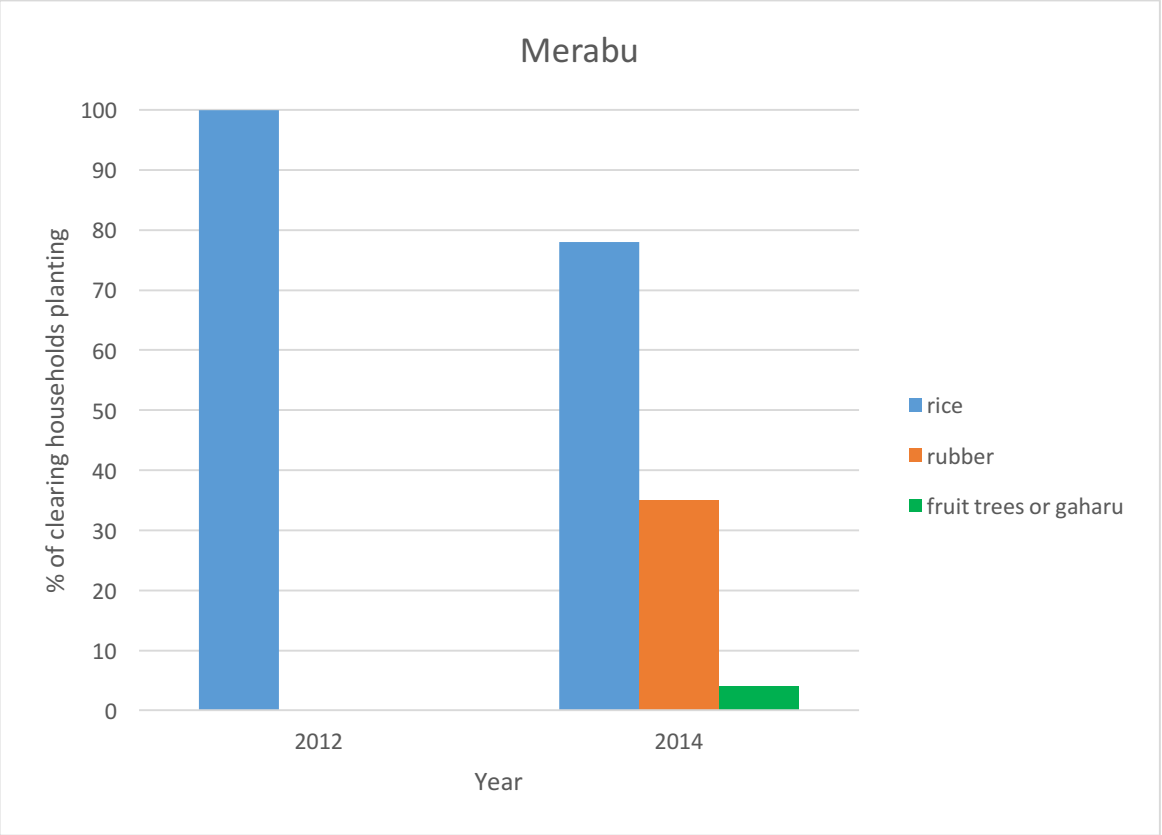
These agreements would appear to constitute an important change in the swidden dynamics of the two villages. Where prior to the agreements villagers were predominantly opening ladang in new forest areas, they should now only open ladang in fallows, sparing forest land through agricultural intensification. It was explicitly understood that this commitment was dependent on alternative livelihood support from TNC, which has focused most heavily on the planting of rubber gardens and small animal husbandry (Pirard and Lapeyre 2013).[43] In fact, these agreements still allow for the clearing of new forest areas under several provisions, and the immediate impact in the first year of the agreements has been to support new clearing, albeit under the aegis of the village land use plan and ostensibly as a one-time occurrence.

[43] Dove (1993) points out that rubber may not actually be understood as an 'alternative' to rice, since there remains in many Dayak communities a strong cultural emphasis on rice cultivation and the subsistence sector.

First, households that have not yet reached the maximum swidden land base of four or seven plots are permitted to clear new forest area. In addition to migrants to the village, these households include young adults from the village who are starting new households. While their parents may already have a full land allotment, these younger households are licensed to clear forest for new ladang up to their own allotment. Under the agreements, as population grows so will clearing, but in a fixed proportion of land per household. Second, TNC is supporting the establishment of 2 ha of rubber garden per household. While Kalimantan Dayak have a long history of rubber cultivation, there was previously little rubber in Long Duhung due to the recent establishment of the village in its current location and the more limited agricultural experience of the Punan inhabitants. There was previously some rubber production in Merabu, but still of a limited nature, in part because of the reliance of Merabu villagers on birds' nest harvesting. The rubber gardens supported by TNC are not required to be established on fallows, so in the first year of the agreement in Merabu, many households opened 1 ha of ladang in forest area along a new roadway, explaining the increase in the number of households clearing forest land. After the first year's rice planting, they will turn the plot over to rubber and repeat the process, so that after two years they will have established their 2 ha rubber allotment. According to the land use plans, after obtaining 2 ha of rubber land and 4 or 7 ha of swidden plots, a household should not engage in any new forest clearing. It will take several years to determine whether that limitation has occurred. CIFOR data show that while in 2010-2012, all new clearing in Merabu was devoted to rice cultivation, in 2012-2014, 35 percent of households planted rubber in new clearings.[44]

[44] A similar shift to rubber occurred in Long Duhung, where the percentage of households planting rubber in new clearings went from 0 to 35 percent. Planting in new clearings is only indicative of larger land use shifts towards rubber, as these statistics do not reflect the planting of rubber in plots previously devoted to other crops.


Long Duhung
120
100
80
60
40
20
0
% of clearing households planting
2012
2014
Year
rice
rubber
fruit trees


Merabu
100
90
80
70
60
50
40
30
20
10
0
% of clearing households planting
2012
2014
Year
rice
rubber
fruit trees or gaharu

Figures 5.22-23: 5.22) Crops planted in new clearings in Long Duhung; 5.23) Crops planted in new clearings in Merabu.

While the TNC agreements thus permit limited expansion of swidden and rubber gardens into new forest areas under certain conditions, the organization's strategy is to control and limit the clearing through village land use and development planning, comprising a strategy of land sparing via land use intensification. I focus particularly on Merabu, because of the importance of contentious land change processes in the village and because I was a participant observer at the assembly to evaluate the first year of the conditional payments agreement in March 2015.

Evaluating the Merabu Agreement: Contentious Clearing versus Forest Governance

In Merabu, the recent construction of the logging road to the village opened up a large area of land that was previously less accessible. Land along the road would almost certainly have been deforested in any case, but under the village land use plan, the land along the road to the northwest of the village was zoned for rubber gardens and divided into 2 ha plots, which were allocated to each household in a random drawing. The resulting arrangement asserts village control over the area and allows for expanding livelihood activities, but does so in an ordered way that aims to avoid the conflicts and inequities that often accompany the opening of a new land frontier.

The village agreement, conditional payments contract, and land use plan have not fully eliminated contentious land change processes from the Merabu swidden system, however. The one-year evaluation of the conditional payments agreement took the form of a village assembly facilitated by TNC staff, where villagers discussed the activities that had taken place and evaluated themselves according to the agreed upon targets. While the villagers and TNC agreed that financial management, training, and forest patrol targets had been met, the issue of swidden clearing emerged as a clear dilemma for participants. At the prompting of a TNC staff member, villagers acknowledged that four households had cleared new swidden plots along the road to the southwest

of the village in the area zoned as reserve land under the village plan.[45] Discussion then ensued about whether this clearing constituted a violation of the village agreement.

While none of the four households that had cleared in the reserve zone were in attendance at the evaluation meeting, the possible violation concerned all villagers because of their collective commitments and the potential for violations to affect the amount of funding provided to the village in the coming year. Opinion among the villagers was divided. Those who viewed the clearings as a violation pointed to the letter of the agreements, while those on the opposite side advanced a variety of reasons why these clearings should not be considered a breach. The first justification offered was that people had opened in the reserve land in order to keep outsiders from encroaching. Villagers from Merapun have been challenging Merabu's control in this area, so swidden was in this case viewed as a means of territorialization. It was also noted that those opening in the reserve land had not cleared more than 1 ha nor had they exceeded their total land allotments. Other villagers pointed out, however, that if the transgressors were intending to keep away Merapun villagers, they had opened their swiddens on the wrong side of the road. A second justification suggested was that the plots distributed for rubber were not all equally desirable, and those who had drawn worse plots might prefer to open land elsewhere. Discussion focused primarily on the territorial justification. On another occasion, a villager explained to me that people in Merabu were no longer opening ladang in new forest area *except* when there was a boundary conflict with another community, in which case they would clear forest to claim the land. The territorial function of swidden is clearly still considered a legitimate determinant of clearing by a significant proportion of the village population.

[45] Reserve land in principle would be set aside for management by future generations.

This episode illustrates the encounter of competing territorializations. Territorialization through swidden clearing conflicts with territorialization through spatial planning. The spatial planning approach has the additional attribute of helping the village to elaborate village development plans, through which the village can access funding from the Indonesian government, according to a TNC manager. Enforcement of village territorial control is also supported under the spatial planning approach through forest patrols. Nonetheless, in an area where control is contested with another village, spatial plans and occasional patrols do not have the materiality or cultural weight of a swidden plot. This episode also illustrates the paradox of swidden as a form of territorialization, however. In the view of one of the TNC staff members most familiar with the village, the households opening ladang in the reserve land were motivated not by collective territorial control, but by private speculative interest. He noted that there is already an area near Merabu, near the reserve land and Merapun, which has been zoned as conversion forest by the central government (meaning it can be converted to non-forest uses), and there is an area (where most of the reserve land lies) that is still classified as production forest (meaning it should remain under forest uses). Merabu villagers fear that if people from Merapun continue entering and degrading the production forest, it will be rezoned to conversion forest, and then oil palm will enter and the village government has no authority to prevent it. The four transgressing households do not expect the village government to keep out the oil palm plantations. By opening swidden in the contested area and establishing land claims now, they may at least receive compensation if the land is expropriated for oil palm.

Speculative and territorial drivers of household decision-making intersect in this case, and because these clearings happened contrary to the village forest governance agreements, we can identify contentious land change in Merabu as the cause of roughly 4 ha of new deforestation. In

the CIFOR sample of 33 Merabu households, 70 percent cleared forest land in 2012-2014, averaging 0.64 ha/household/year of clearing. Extrapolating to the village population of 56 households, I estimate that a total of 25 ha was cleared in 2014.[46] I therefore estimate that 4 out of 25 ha of clearing, or 16 percent of the 2014 deforestation in Merabu, was determined through contentious land change processes. While the four transgressors would likely have cleared ladang within the proper zone had they not opened ladang in the reserve land, the rubber zone was slated for conversion, while the reserve land clearing constitutes deforestation that would not otherwise have occurred were it not for these specific processes of contentious land change.

In the end, community members voted 8 to 5 that the clearings in reserve land were not a violation, and they gave themselves full points for compliance with the swidden clauses of the agreement. Most villagers in Merabu would prefer not to lose their lands to oil palm. Nonetheless, this account illustrates that under conditions of high tenure insecurity, hedging against future expropriation may be rational despite the risk of forgone payments from TNC. In this case, speculating households hedged against future expropriation and the village did not lose any payments due to their clearing, but the village authorities subsequently penalized those households by excluding them from further benefits under the conditional payments agreement.

Swidden as a Focus for Eco-Modernist Forest Governance

The attempted re-ordering of swidden practice in Merabu and Long Duhung is not limited to the interactions between TNC and the communities. Rather, it intersects with government policy and corporate practice as a nexus for the emergence of a land sparing coalition advancing eco-

[46] New clearings usually average about 1 ha in size, but not every household clears land every year, explaining average annual clearing of less than 1 ha/household. Clearing in 2014 may have been higher than in 2013, given incentives for rubber production. If all 39 households estimated to have cleared forest in 2012-2014 cleared new ladang in 2014 itself, then a lower bound for the proportion of contentious clearing would be 4 out of 39 ha, or 10 percent.

modernist forest governance in Berau. Conspicuously, for a program aimed at reducing emissions from deforestation, there has been virtually no participation in BFCP by oil palm or tree fiber plantation companies, which are the industrial sectors most responsible for conversion of natural forests in Berau (Griscom et al. 2016), or the mining sector, which is responsible for relatively little direct deforestation, but has large secondary impacts.

Prior to 2015, TNC had also largely failed to target these sectors in its Berau program. Engagement with the oil palm sector was delayed in part by changes in BFCP organization and negotiations between TNC and funders, a TNC staffer explains (TNC42 150709). An appropriate model for reining in plantation-driven deforestation has also been lacking. 'Land swaps' that would allow companies to trade forested areas within a concession for degraded lands currently within the forest estate were promoted as a model during the early 2010s by the World Resources Institute (Gingold et al. 2012), but TNC has found the model infeasible in Berau because most forestry concessions are active and there is little degraded area suitable for oil palm within the forest estate, according to provincial and national-level TNC staff (TNC42 150709; TNC32 150302). Limiting oil palm expansion is also politically sensitive given the centrality of oil palm to district and provincial development plans and the payoffs that district officials receive from oil palm companies. In 2015, TNC launched a 'Sustainable Palm Oil' program with four years of funding from the German Federal Environment Ministry with a land use intensification logic of landscape-level land use planning to reduce deforestation from oil palm expansion by directing new plantations toward degraded lands and away from high conservation value forest (BLI/P3SEKPI 2016; TNC42 150709), among other goals. TNC staff acknowledged, however, that the oil palm sector had been a major gap in their Berau program until the time of my research (TNC34 150501).

Community initiatives and sustainable logging, meanwhile, have been the areas of most substantial on-the-ground activity by TNC and other environmental organizations working in inland Berau. Activities in the forestry and communities sector include TNC and FORCLIME support for logging companies to adopt reduced-impact logging methods and achieve sustainability certifications; logging company and community participation in collaborative forest management; and the government's establishment of the Forest Management Unit (KPH) for western Berau and the granting of 'village forest' (*hutan desa*) rights. In 2014, Merabu was granted a village forest area over part of the protected forest land within village boundaries, becoming the first village in Berau to obtain a *hutan desa* designation.[47]

The regulation of swidden practice is also a cornerstone of the intersecting governance initiatives in the community-forestry sector. The beginning of industrial logging in East Kalimantan in the 1970s coincided with government efforts to resettle and sedentarize upland populations, which on the one hand served to make those populations 'legible' to the state (Scott 1998), while on the other it cleared space for industrial resource extraction. Conflicts between logging companies and communities have sputtered over the decades, but currently logging companies in Berau tend to respect communities' rights to cultivate a certain amount of swidden area within their traditional territories. Further delimiting the practice of swidden remains common cause for a coalition of government and NGO actors in the forestry sector. While most do not view swidden as a major environmental problem, they nonetheless see reform of swidden as desirable and progressive. Both a FORCLIME employee and a district REDD coordinator claimed that ladang is the largest source of *illegal* deforestation in Berau, since conversion for plantations and

[47] The Merabu *hutan desa* petition was facilitated by TNC, who led the participatory mapping process with the community and liaised with government bureaucracy. For more on *hutan desa*, see Akiefnawati et al. (2010).

mining occurs under government licenses (GIZ04 150416; BER04 150408). This 'illegality' of ladang speaks to the government's desire to suppress shifting cultivation, and facilitates the confluence of government and NGO interest in making ladang "more effective," in the words of a local NGO director (BER13 150415), or offering "alternative economies," in the words of the REDD coordinator (BER04 150408; cf. Dove 1983). Government officials in the district Forestry Agency and Environment Agency also mention the use of fire as a danger of swidden cultivation (BER02 150317; BER08 150413), though Berau has not suffered fires of the same severity as East Kutai and other districts further to the south. In one case, the district government is reported to have made shifting from swidden to permanent agriculture a requirement for confirming a village's administrative status (Anandi et al. 2014, 374).

From the environmentalist side, control of swidden has been central to NGO community work as a land sparing strategy linking climate change mitigation with promotion of productivist community 'development.' Like TNC, FORCLIME stipulates that communities participating in its REDD demonstration activities should not clear new forest areas, and it encourages rubber planting, small animal husbandry, and commercialization of non-timber forest products such as honey and herbal tea. One FORCLIME employee imagines the possibility of a moratorium on swidden, saying, "People deforest for their stomachs, for rice. If we pay for their rice, they wouldn't deforest."[48] He contemplates a strategy of hill rice intensification and the development of wet rice production leading eventually to a moratorium on shifting cultivation. TNC's model of village land use planning and alternative livelihoods development pioneered in Long Duhung and Merabu

[48] This statement entirely neglects the cultural value of swidden, a point I owe to Carol Colfer. For more on the cultural value of swidden, see Colfer (2008), Dove (1993; 1998), and Gönner (2000b).

has been codified in SIGAP-REDD+, where swidden limitation is one among various options for communities to mitigate carbon emissions.

The effect of these interlocking initiatives is that land sparing swidden control – for climate change mitigation, for state administrative control, and for industrial timber extraction – has become a central component of an emergent forest governance coalition in Berau that integrates government, logging companies, NGOs, and communities in managing a landscape of timber concessions and small-scale agricultural and hunting and gathering activities. The relatively minor contribution of swidden to overall deforestation in Berau makes it particularly noteworthy that swidden has received such emphasis in the development of forest governance in the district. One TNC manager explains the focus on communities, affirming that while the emissions reductions of community activities may not be great in themselves, the impact of community work is substantial because it serves as a way to attract government attention and commitment, to engage with companies, and to enhance the capacity of local NGOs. This multi-stakeholder coalition could ostensibly then expand to develop environmental governance in other sectors.

While TNC's new oil palm project may bring change to that sector, at present the community-forestry environmental governance project is being undercut by the expansion of industrial mining and especially oil palm plantations, which introduces new ‘stakeholders’ and contentious processes that upset the community-forestry consensus. In Long Duhung, where logging is the primary industrial land use, swidden area has been expanding primarily due to agronomic reasons, but conflicts with the neighboring Kenyah village herald indirect impacts from oil palm. In Merabu, where oil palm and mining threaten to enter the village territory, the agronomic drivers of swidden expansion are more limited, but territorialization and speculation are driving additional swidden clearing in natural forest areas.

The emergence of a strategy of land sparing forest governance through control of swidden and more broadly through the conciliation of community livelihoods and industrial forestry, and the failure to integrate mining and plantations into the land sparing coalition, may be explained by the fact that community livelihoods and timber harvesting can be compatible with natural forest cover, while oil palm, fiber plantations, and mining require the conversion of forest to an alternative land cover. Government actors within the extractive regime are happy to limit the area under swidden as a way of sedentarizing villagers and promoting the production of commodities such as rubber, but officials at both the district and provincial levels view industrial plantations, in particular, as the key to economic development. They have no intention of limiting the overall expansion of plantations in favor of forest conservation. Controlling swidden does not challenge the expansion of extractive land uses, so it has become a site for successful coalition-building, while governance of the more significant drivers of deforestation in Berau remains elusive.

Persistence of the Extractive Regime

The expansion of the mining and plantation sectors in Berau undermines the viability of the small-scale rural livelihoods on which the existing district land sparing coalition is anchored. Even communities whose territory remains forested are challenged by landscape-level forest fragmentation (which affects biodiversity and species abundance), hydrological and regional climatic changes caused by large-scale forest clearing, and socio-economic transformations that trigger resource conflicts and drive contentious land change. The current status of swidden as a focus of eco-modernist forest governance structures in Berau may not herald the long-term viability of forest-dependent livelihoods so much as it indicates the inability of environmentalist actors to otherwise check the extractive juggernaut of coal mines, tree plantations, and oil palm currently steamrolling the remaining forests of Berau.

A TNC manager acknowledged in an interview the predicament of forest conservation on an extractive frontier: "BFCP doesn't mean there will be no deforestation. We need to take into account the district development plan. With APL [land zoned for agriculture], it's just a matter of time before they convert it to mining or oil palm. If we had shown up and said 'you can't have any more clearing,' we would have been kicked out of Berau long ago" (TNC31 150205). Current and former TNC staff recount their difficulties in gaining support from the "feudalistic" Berau Government (TNC27 141219). Indonesia's extractive economy is filtered through the legacy of the Berau sultanates in the district government, which is seen as being hierarchical, nepotistic, and exclusive. "There's all sorts of deals going on [in Berau]," a former TNC manager recalled, "TNC wanted to get a deal for conservation. …Berau is happy to have the profile and publicity [of BFCP] and to have TNC spending money, but until you show success, it's hard to get them fully on board" (TNC41 150611). Informants also suggest that district officials have had more favorable attitudes towards FORCLIME than TNC because FORCLIME funnels money directly through the government bureaucracy, whereas in the case of TNC, "district officials see, 'oh, TNC has this money, but it doesn't go to us'" (TNC30 150128). FORCLIME has faced identical challenges to TNC in bringing the district into a coalition for ecological modernization, however. As one former FORCLIME employee recounts, "FORCLIME shares with DPRD [the local assembly] and the bupati, and they're enthusiastic, especially about supporting communities with short-term investments, but then they carry out contradictory activities, such as giving APL [land outside the forest estate] over to oil palm. It's the same everywhere" (GIZ06 150427).

In the rapidly expanding plantation and mining sectors, the predominance of extractive relations is clear. "The problem is that oil palm is massive," the same FORCLIME employee laments, "…Oil palm is from the government, so we can't do anything to stop it" (GIZ06 150427).

When in 2011 or 2012 TNC supported villagers in the Segah watershed to oppose an oil palm concession in the region, the bupati became furious and nearly kicked TNC out of Berau (TNC32 150302; TNC30 150128). Since then, the oil palm company has courted some village leaders with money and travel, and succeeded in turning some of them against the conservationist agenda (TNC32 150302). Even those palm oil companies that wish to avoid converting forest areas are hamstrung by the government institutions for allocating concessions, which are a key source of rents for government officials. One informant reports that for an oil palm permit, a company had to pay IDR 25 million ($2000) each to nine different people, with the bupati also receiving a cut. Another informant notes that district candidates spend at least IDR 10 billion ($770,000) to get elected, so "once they are elected, they are thinking about returning their investment through natural resource permits [bribery] and district budget markups [overbilling]." Corruption is endemic across the extractive sectors. Officials from the district Forestry Agency reportedly used to demand IDR 300 million ($23,000) from companies to approve their yearly harvest plans, though as the large-scale timber concessions have declined, the head of the agency reportedly asked a company for only "'modest' bribes, because times are harder now." If a company were not to pay bribes, it would not have its permits approved and would be investigated by the district agencies, a process that would be expensive and time-consuming for the company.

Berau's natural resources generate vast wealth that flows to companies, shareholders, corrupt officials, and productivist importing economies, degrading the local environment and generating virtually no reinvestment in enhanced productivity or articulated socio-economic development in the district. Coal mining is exemplary in this respect. PT Berau Coal provides career opportunities for its employees, many of whom are from other parts of Indonesia, and a corporate social responsibility (CSR) "slush fund" for the district (TNC42 150709), but as a

company CSR officer stated matter-of-factly, "CSR is a strategy to keep operations going and avoid social conflict" (BER19 150418). As coal is wrested from pits in Berau for boilers in China and the Philippines, hundreds of millions of dollars flow to the politically-connected Bakrie family or to financier Nat Rothschild, and hundreds of millions more are embezzled away (Moulds 2013; Kahn and Mellor 2013). Capital accumulates in Jakarta and London and carbon dioxide accumulates in the atmosphere, leading to more extreme El Niño droughts, more severe fires in Kalimantan, and more deforestation. Meanwhile, Bank of America Merrill Lynch has made well over $100 million through investments and financing related to Berau Coal (Appleby Global Group 2014; "Roger Suyama" 2015), and then advertises its efforts to address global climate change with a $300,000 donation to the Berau Forest Carbon Program (Bank of America 2010). Erik Meijaard is quite right: "everything in conservation is utterly out of control" (Meijaard 2015). Extraction is the law of the land.

Conclusion

The discourse of East Kalimantan as a 'green province' has in Berau its district corollary, but at the district, provincial, and national levels in Indonesia, 'green' coalitions are overwhelmed by the extractive political-economic regime. TNC has operated through different forest conservation strategies in East Kutai and Berau districts, maintaining a protected area focus in East Kutai with its Wehea program while developing a district-level REDD initiative through BFCP in Berau. Aggregate deforestation in East Kutai is greater than in Berau, and deforestation in East Kutai has accelerated more rapidly. Berau has been spared the El Niño fires and district fragmentation (*pemekaran*) that helped accelerate deforestation in East Kutai, but the oil palm frontier has come to Berau, and extractive land conversion is on the rise there as surely as in its neighbor to the south. Ironically, TNC staff have told me they find the East Kutai district

government more progressive and easier to work with than the Berau government, with its feudalistic legacy (TNC33 150309; TNC27 141219). Of course, when most of the commercially valuable forestland in East Kutai has already been cleared or is slated for conversion, it is easy to make a show of protecting the forest vestiges of Wehea and the Sangkulirang karst. Deforestation in East Kutai and Berau is highly correlated and trending upward, though with high inter-annual variance (Figure 5.24), reflecting the dominance of economic factors over forest governance processes in determining forest clearing (Wheeler et al. 2011).

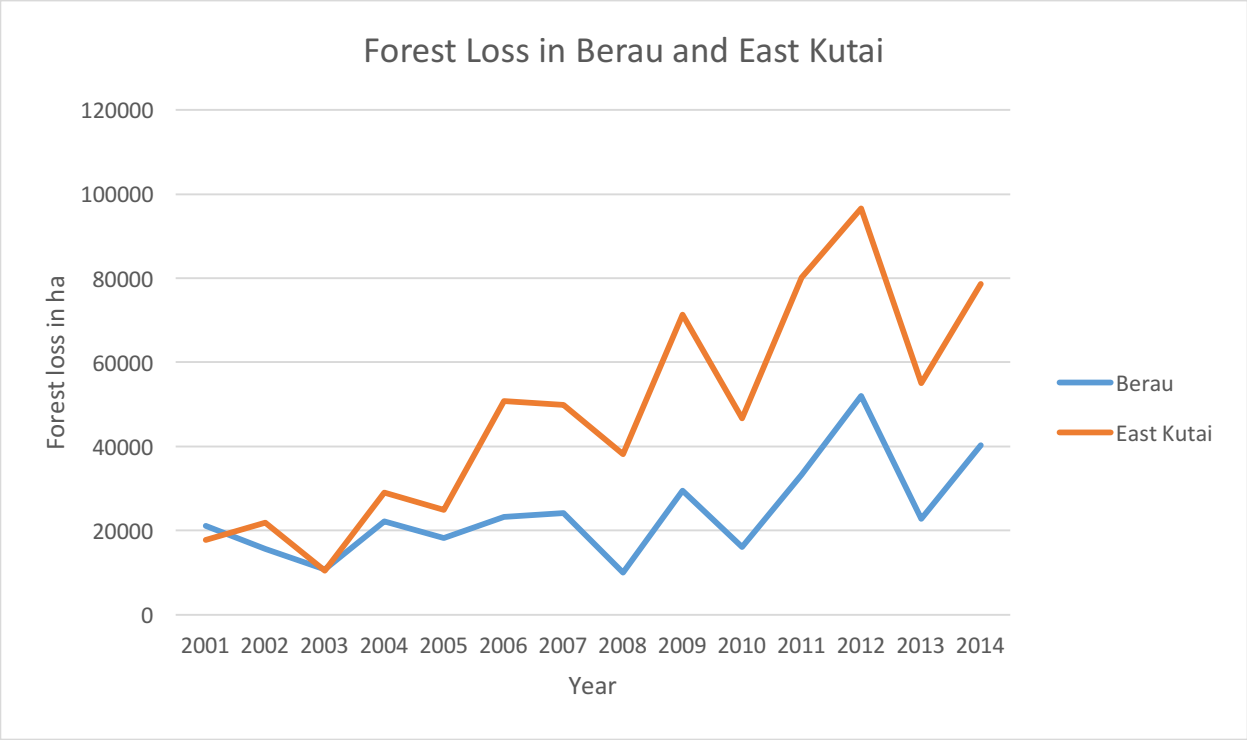


Figure 5.24: Forest loss in Berau and East Kutai at >30 percent canopy density, calculated with Global Forest Watch (Hansen et al. 2013). Pearson's r = 0.87.

The global green growth complex has crystallized in Indonesia in a coalition comprised largely of international and domestic NGOs, international institutions and bilateral cooperation agencies, academics, and certain corporations and government bureaucrats. In the agriculture and forestry sectors, land sparing policy discourse is deployed to support agricultural intensification

through control of swidden and improved oil palm productivity, as well as land use intensification through siting of plantations on 'degraded' lands. These land sparing strategies serve state interests in territorialization and control of populations and resources, as well as corporate interests in industrial productivity and expansion, but they have failed to fulfill environmentalist and community interests in forest conservation. The coalition for productivist ecological modernization through land sparing in Indonesia is at every level stymied by the persistence of political-economic institutions supporting the extraction of materials and energy.

Extractive political-economic regimes are the characteristic peripheral political-economic formation. Extraction in Kalimantan proceeds through articulated extractive frontiers of logging, mining, and plantation conversion. While profits in these sectors accumulate predominantly to domestic and international political-economic elites, profits and wages also accrue to medium-scale oil palm investors, smallholders, and local laborers employed particularly by logging and plantation companies. These various processes of inclusion and (adverse) incorporation (John McCarthy 2010) add dynamism and resilience to extractive industries, even as they progressively degrade local socio-ecologies. In addition to the loss of forest land and the corresponding loss of forest-dependent livelihoods and biodiversity, indicators of environmental degradation include severe forest fire and haze events (Gellert 1998; Gönner 2000a; Koplitz et al. 2016) and increased erosion and flooding (J. Wells et al. 2016), both of which have strongly negative social impacts. Mining operations also contribute to increased flooding (J. Wells et al. 2016) and water pollution. River fish are an important source of protein for inland populations, and a 2015 study found that fish in the delta of the Mahakam River, East Kalimantan's primary watershed, contained over 1300 times the tolerable level of lead and over 2000 times the tolerable level of cadmium (Adri 2015). Pellier et al. (2014) report that children in degraded landscapes of Kalimantan have sharply

negative expectations of their future environmental conditions.

The degradation of Indonesia's socio-ecological systems is not accidental, but rather systematically produced by the global capitalist dialectic of extraction and production. The negative socio-ecological impacts of capitalist accumulation are externalized by the productivist economies of the capitalist core through global circuits of capital and internalized by the humans and other lifeforms of the peripheries. Ecological modernization as a policy discourse of late capitalism wrecks against Indonesia's extractive regime. Eco-modernist actors may be reduced to virtual impotence – "When power or politics comes to the arena, TNC is always the loser," rues a TNC manager (TNC32 150302) – or they are reduced to greenwashing. Environmental NGO Fauna & Flora International (FFI), for example, receives millions of dollars from mining companies including Anglo-American, Rio Tinto, and Billington to work on biodiversity conservation and community development around mine sites. A former Billington employee serves as the Corporate Partnership Manager of FFI Australia's 'Business and Biodiversity Team,' meanwhile Billington invests hundreds of millions of dollars in mining coal, a major source of carbon emissions, in remote rainforest areas of Central Kalimantan (Hawdon 2011). Even WWF's Heart of Borneo Initiative, which began in the early 2000s as an attempt to protect an intact wilderness landscape, had been retooled by 2012 as a 'green economy' initiative (Paddenburg et al. 2012).

The Indonesian case studies in this chapter demonstrate the operation of an extractive regime across multiple levels and reveal how extractive regimes mediate possibilities for forest governance and regional development. Efforts by productivist coalitions are stymied by extractive structures, and even where local allies support a productivist agenda, lower level productivist impulses and their goals of land sparing and ecological modernization are limited and undermined

by the higher level extractive regimes. Jeremy Campbell, in his study of the Novo Progresso region in southwestern Pará, describes the political economy of Brazil's Amazon frontier as a system "rigged for theft and destruction" (J. Campbell 2015a, 198). This characterization is equally apt as a description of the extractive political economy of Indonesian Borneo, and the extractive regimes of the capitalist world system in general. In the Brazilian Amazon, however, a land sparing complex has dramatically reduced regional deforestation as part of a strategy to shift the political economy of the Amazon region from extraction to productivism. Chapter 6 explores the conditions and processes of this socio-ecological transformation.

CHAPTER 6

BRAZIL: 'DEVELOPMENT'

THE TRANSITION FROM EXTRACTION TO PRODUCTIVISM[49]

> "The challenge of strengthening Brazil as an agricultural and environmental power must take into consideration the planning and territorial management of agriculture. This is the condition for gaining productivity and saving natural resources. …The growth of agricultural production with preservation also involves a new organization of ranching, where intensification of the sector is an indispensable part of a broad optimization of land use."
>
> *- technicians from the federal Secretariat of Strategic Affairs (SAE) writing in the Brazilian trade magazine* Agroanalysis (Fleury and Pereira 2013)

> "We are isolated, and anything we do is repressed. We have been bound in place. …Until the new regulations, we worked normally. We received financing from the bank to buy cattle, and everything was going well until 2009. …Before, smallholders might sell their properties under pressure from larger property owners, although in my region this was not the case, but now smallholders are selling to larger producers out of necessity. Just in my region eight smallholders have sold and only one person has bought all their properties."
>
> *- small farmer in São Félix do Xingu, February 2014* (SFX08 140206)

The history of capitalism is uneven development. Extractive regimes are enduring political-economic formations integrally linked with productivist core economies, but the geographies of extraction and production are dynamic and evolving. The Italian city states were displaced by the Iberian empires, Great Lakes manufacturing became a Rust Belt, China went from the Opium Wars and the coolie trade to becoming one of the largest importers of tropical resources, such as timber, soy, and palm oil. Core and periphery are not immutable properties of particular regions, and while the structure of an extractive regime militates against productivist reinvestment and articulated development, regimes do change, and regions move from periphery to core, from extraction to

[49] This chapter draws on material that has appeared in publication in Thaler (2017), "The Land Sparing Complex: Environmental Governance, Agricultural Intensification, and State Building in the Brazilian Amazon."

production. Capitalist growth is also capitalist expansion, and as extraction expands at the capitalist frontier, so too expands the productivist frontier internal to the capitalist world system.

For modernization perspectives, the move from extraction to production is a key stage of modernization and 'development.' A great deal of ink has been spilled explaining how this transformation happens. Institutionalists puzzle over why extractive regimes 'waste' natural resources. It was even the title of William Ascher's (1999) oft-cited book, *Why Governments Waste Natural Resources: Policy Failures in Developing Countries.* 'If only developing countries got their policies right, they would stop wasting resources and develop,' the institutionalist perspective imagines. This perspective fails to recognize that many 'policy failures' are in fact functional characteristics of an extractive regime, but it is not wrong that institutions are at the crux of the differentiation between extractive and productivist economies (Acemoglu, Johnson, and Robinson 2001). Modernization thinking goes wrong where it extends the observation that some places become 'developed' into the fallacy that over time, everywhere can become developed and there will be no more extraction. In the case of forests, the modernization theories of land sparing and the forest transition replicate this error by extending the observation that in some places agricultural intensification has coincided with declining deforestation to the fallacy that forest conservation and agro-industrial development are globally compatible.

Vast areas of the Brazilian Amazon have been deforested since the 1980s for cattle ranching and industrial field crops (Rudel, DeFries, et al. 2009); between 2004 and 2016, however, annual deforestation in the Brazilian Amazon declined over 70 percent,[50] even as agricultural production in the region increased. This dramatic transition has been widely promoted as a

[50] Deforestation figures in this chapter are from INPE (2017). Since 1988, INPE (the Brazilian National Institute for Space Research) has used Landsat imagery to annually report clear-cutting of areas over 6.25 ha in Amazonian primary forest.

'deforestation success story' (Boucher et al. 2014), a model for other countries such as Indonesia (Tollefson 2015), and an example of land sparing (Macedo et al. 2012). In this chapter, I use an incorporated comparison and organizational ethnography of TNC's programs across four municipalities in two states in the Brazilian Amazon to illuminate the mechanisms and political-economic character of Brazil's land use transition.

I argue that new governance arrangements reducing deforestation in the Amazon are part of a project of economic development and state-building through environmental regulation. This project is driven by a complex of government, NGOs, and corporations united by a logic of land sparing. The land sparing complex has deployed environmental regulation to promote state territorialization and agricultural intensification in a way that inverts previous territorialization and conservation strategies. The complex's ultimate goal is a regional transition from an extractive economy that degrades local resources to a productivist economy that supports articulated socio-economic development. This transition has been unevenly realized, and declining deforestation has been accompanied in some areas by economic stagnation and smallholder dispossession.

By identifying the land sparing complex in Brazil and its socio-economic and environmental consequences, this chapter advances a systemic understanding of the Amazonian governance model, helping to illuminate the sociological organization of neoliberal (environmental) governance and the relationships between environmental policy, agricultural development, and state-building. Analysis of the Amazonian land use transition reveals one pathway of transformation from an extractive to a productivist regime through a key dimension of the capitalist metabolism, that is, land use, and specifically tropical deforestation. Simultaneously, by situating Amazonian transformations in regional and global perspective, we can identify the displacement of deforestation and extraction that is dialectically linked with the Brazilian

Amazon's productivist, land sparing transition. This chapter explicates the apparent 'decoupling' of deforestation and agricultural production in the Brazilian Amazon, while Chapter 7 turns to the question of displacement.

From Institutionalist to Systemic Explanation

Most scholarly explanations for the Amazonian transition take an institutionalist approach and focus primarily on enumeration of proximate causes. While macroeconomic and climatic factors remain important deforestation drivers (Geist and Lambin 2002), deforestation reductions in Brazil are attributed especially to new governance arrangements, including supply-chain sustainability initiatives (Nepstad et al. 2014; Gibbs et al. 2016), expansion of conservation areas and indigenous territories (Nepstad et al. 2006; Soares-Filho et al. 2010), and measures supporting compliance with environmental regulations including enhanced enforcement, restricted agricultural credit, and funding for sustainable agriculture (Assunção, Gandour, and Rocha 2012; Arima et al. 2014). Nepstad et al. (2014) review 51 different policies and programs that "may have influenced the decline in deforestation" in the Brazilian Amazon (S18).

These existing explanations take a predominantly "technical" approach to policy (Li 2007b), either attempting to quantify effects of specific policy interventions on deforestation (Assunção, Gandour, and Rocha 2012; Arima et al. 2014; Gibbs et al. 2016), or listing policies and processes out of whose interactions deforestation reductions emerge (Hecht 2011; Lapola et al. 2013; Nepstad et al. 2014). Largely absent is a systemic political account that looks beyond proximate factors to the actors and interests that generate the policy environment. One exception is Lapola et al. (2013), who link deforestation reductions to agricultural intensification in a "pervasive transition of the Brazilian land-use system" (27) that consolidates agro-industry while reinforcing land concentration. Yet Lapola et al. focus on the national level and do not specifically

analyze Amazonian governance. A second exception is Baletti's work describing how environmentalism and developmentalism "reterritorialize" the lower Amazon (Baletti 2012), and how environmental governance facilitates industrial soy "neoextractivism" (Baletti 2014). Baletti does not elucidate linkages between territorialization and agro-industrial development under a land sparing agenda, however.

This chapter develops a theorization of Amazonian environmental governance that moves beyond institutionalist explanations of discrete interventions to a systemic understanding of actors, interests, and processes. I focus on the confluence of government, NGO, and corporate interests that links territorialization, agricultural intensification, and forest conservation under a land sparing complex in the Brazilian Amazon. While community associations, indigenous peoples, social movements, and others interact with the land sparing agenda, those groups' social visions differ from the land sparing vision shared by government, corporate, and NGO actors in the land sparing complex.

The Amazonian Extractive Economy

The Brazilian Amazon, like the Outer Islands of Indonesia, has historically been characterized by minimal presence of the central state and 'boom-and-bust' resource exploitation that fails to generate longer-term productive circuits of accumulation. Bunker (1985) developed his theory of extraction and production in the capitalist world system through a historical study of the Amazon, arguing that the Amazonian economy operates through a "mode of extraction," where resources are removed from the region to be transformed and consumed in core areas that operate through a "mode of production." This extractive economy destroys value in energy and material,

under-developing the Amazon as it builds the value and complexity of productive economies elsewhere.[51]

As Hecht and Cockburn write in *The Fate of the Forest*, their seminal work of Amazonian political ecology, "What is now called the environmental destruction of the Amazon is merely the latest surge in a long epic of annihilation" (2010, 63). The very birth of the Portuguese colonial endeavor in Brazil in the early 1500s was grounded in the rapacious extraction of pau-brasil (brazilwood), a species endemic to the Atlantic Forest region, which was exported to Europe for use in woodworking and the production of dye for the textile industry. Pau-brasil was exploited nearly to extinction, while its Atlantic Forest habitat was subsequently decimated by colonial agriculture, especially sugar and coffee production. In 1534, the Portuguese crown created fourteen hereditary captaincies (*capitanias*) through which members of the Portuguese nobility were charged with developing the territories of coastal Brazil. The capitanias reached the eastern edge of the Amazon region, which became a source of forest products and slaves (Schmink and Wood 1992, 38), while the economy of the littoral revolved around sugar and the slave trade, which after the mid-16th century included African as well as Amerindian slaves. The search for precious metals was a constant of the colonial economy that continues to the present day. In the early 1700s, Cuiabá, which is today the capital of Mato Grosso, was a center of gold mining under the capitania of São Paulo.

From the second half of the 18th century, the Companhia Geral de Comércio do Grão-Pará e Maranhão, a chartered trading company, expanded the commercial linkages between Europe and the Amazon Basin (Almeida 2015). The principal commodities of the Amazonian trade were cacao

[51] In Brazil, the term 'extractivism' often refers to harvesting of non-timber forest products such as rubber. My discussion of 'extraction' and 'extractive regimes' in this chapter is consistent with my usage throughout, and unless quoting other authors, I only use the terms 'extractivist' and 'extractivism' in relation to harvesting of non-timber forest products. See also Chapter 3.

and various 'spices' (known as the *drogas do sertão* – 'drugs of the hinterlands'), including clove-bark, copaíba oil, and achiote (*urucu*), as well as gums and latex, particularly rubber, and timber, pelts, and brazil nuts (*castanha-do-pará*). The Amazonian region, known as Grão-Pará, integrated uneasily into the independent Brazilian state after independence in 1822, exploding in the *Cabanagem* rebellion of the 1830s. This rebellion undermined the landed elite of the colonial period, who were then displaced by the commercial elite that rose with the Amazon rubber boom (Schmink and Wood 1992, 42).

The Amazon Rubber Boom

Fine Pará rubber (*borracha*), coagulated from the latex of *Hevea brasiliensis,* a tree endemic to the Amazon, was an important product in Amazonian trade from the mid-18th century onwards. Hecht and Cockburn note that already in the 1750s army boots and knapsacks were being sent to Belém from Lisbon for waterproofing. By 1800, Belém was exporting rubber shoes to New England, and an industrial factory for making rubber goods opened in the UK in 1820, while the first rubber factory in the United States opened in 1828 (Hecht and Cockburn 2010, 71–72). With the patenting of vulcanization by Goodyear in 1845 and the advent of steam travel on the Amazon River after 1850, the stage was set for the massive expansion of rubber extraction from the second half of the 19th century into the early 20th century. Rubber proliferated in industrial applications and in tires for the 'bicycle craze' of the 1890s and the automobile industry that emerged in the 1900s, driving an Amazon rubber boom that brought fabulous wealth to the 'rubber baron' elites of Manaus and Belém.

The boom in wild rubber production drove the first establishment of a non-indigenous population in many parts of the Amazon. Latex is extracted from rubber trees by tappers (*seringueiros*), who work 'trails' of trees in the forest, walking the trail early in the day to slash

the trees and returning in the evening to collect the latex, which they later coagulate into a ball (*pelle*) of rubber. By the late 19th century, indigenous populations in the Amazon had been decimated by centuries of violence, disease, and enslavement. The rubber boom touched off a new wave of disruption of indigenous societies, as they faced incursions by non-indigenous rubber tappers or were drawn into tapping themselves through enslavement or debt relations. *Caboclos* – deculturated indigenous people and people of mixed Amerindian and European descent – comprised a large proportion of the tapper labor force. Simultaneously, a drought in Northeastern Brazil collapsed the regional cotton economy, and hundreds of thousands of migrants left the Northeast for the Amazon, where they joined the *caboclo* population as rubber tappers along the Amazon River and its tributaries. The rubber boom also had the effect of increasing extraction of other forest products such as cacao and brazil nuts, which were collected by tappers during the wet season when rubber extraction became more difficult.

The rubber economy was structured through a system of debt relationships known as *aviamento*, which subjected tappers to oppressive living and working conditions and served to force them into permanent extractive production (Weinstein 1983). Meanwhile, in Manaus and Belém, the rubber barons built opera houses, decorated their homes with Portuguese tiles, and are said to have sent laundry to be washed in Paris. The rubber boom finally came to an end in the 1910s, when the successful domestication of *Hevea brasiliensis* on British plantations in Asia broke the Amazonian rubber monopoly. Brazil nut extraction expanded after the rubber crash, but it was not until World War II that the Amazonian extractive economy again intensified, when Japanese action in the Pacific isolated the United States from Malayan rubber plantations, and Brazil was called upon to fill the gap in exchange for millions of dollars in aid. More than 55,000 people – mostly poor Northeasterners – were sent as 'rubber soldiers' to the Amazon, where nearly

half of them perished from disease or animal attacks before the Japanese surrender in 1945 (Rohter 2006).

The Amazonian rubber boom dramatically altered the socio-ecology of the Amazon Basin. The boom was grounded in the extraction of non-timber forest products, however, particularly cacao and brazil nuts in addition to rubber, and its impacts pale in comparison to the waves of extraction and land cover change that have transformed the Amazon during the Great Acceleration of the post-World War II global economy. As Barbara Weinstein wrote in the early 1980s, "True, the rubber era left the Amazon substantially altered from the preboom period, bringing in new settlers by the hundreds of thousands, populating remote corners of the valley, wiping out whole tribal cultures in the search for new laborers, and creating an extensive network of commercial elites. Yet if the present course of events in the Amazon continues unhindered, we can expect the impact, both in human and ecological terms, to be far greater, far more distressing, than anything witnessed by the region during the rubber boom" (Weinstein 1983, 267–68).

The Great Acceleration in the Amazon

In the period after World War II, a whirlwind of loggers, miners, farmers, and ranchers descended upon the Amazon. During the 1950s, brazil nut extraction intensified in eastern Pará under a system of concessions (*aforamentos*) (Schmink and Wood 1992; Otsuki 2013), while gold mining expanded in the Tapajós basin of western Pará (a center of 'artisanal' placer mining to this day). Road building from the 1950s into the 1970s, especially the construction of the Belém-Brasília highway in 1956-1960 and the completion of the BR-364 highway to Porto Velho in 1968, opened vast new areas for extraction and colonization. Logging in the Caribbean and Central America had depleted most commercial stocks of mahogany in those regions by the early 20th century, but access to new populations in the Brazilian Amazon touched off a 'mahogany rush' in

the 1970s that virtually exhausted regional stocks by the 1990s and was finally terminated by a federal moratorium in 2001 (Grogan et al. 2010).

The federal government directed financing towards the development of agriculture and ranching with the creation of the the Superintendency for the Valorization of Amazonia (SPVEA), founded in 1953, and this support was redoubled after the 1964 military coup, when in 1966 the generals replaced SPVEA with the Superintendency for Development of the Amazon (SUDAM). The landed elites of the Amazon have long objected to the extractivist economy of their region, favoring agriculture as the basis for economic growth (Almeida 2015), a modernist perspective grounded in the theories of the French physiocrats of the 18th century, and in their economic and political interests. The rubber boom had drained labor away from the agriculture and transport sectors and created an "autonomous population of quasi-independent producers" illegible to state control and with a surplus that could not be appropriated by the landed classes (Weinstein 1983, 42; cf. Scott 1998). As Hecht and Cockburn recount:

> "The grand families of Belém yearned for the dignified stability of agricultural empires to rival the sugar estates of the Northeast, the pastoral fortunes of Recife, but their wealth was amassed from products dragged out from the forest by slave or peon…. For decade after decade, agricultural ambitions expired as both labor and capital chased off upriver on yet another extractive jaunt…. This was a mercantile and bureaucratic elite in the traditional style of the Portuguese empire, set in its ways down the centuries. Hopes that Amazonia would gracefully submit to the paradigms of development and shun the raffish temptations of extraction survived into the 1950s when the Superintendency for the Valorization of Amazonia – the initial post-war development agency for the Amazon – proclaimed that the region's vulgar past would finally be extinguished and it would become a cornucopia of respectable crops." (Hecht and Cockburn 2010, 64–65)

The developmentalist military government that came to power in the 1960s sought finally to "inundate the Amazon forest with civilization" (General Golbery do Couto e Silva quoted in Hecht and Cockburn 2010, 116). With a mixture of tax credits and subsidies coordinated by SUDAM and financed by the regional development bank, Banco da Amazônia S.A. (BASA), the federal

government catalyzed the massive expansion of cattle ranching in the Amazon during the 1970s and 1980s, alongside programs encouraging the large-scale migration of small farmers to the region. The brazil nut concessions of eastern Pará were converted to pasture, and a new frontier was opened in northern Mato Grosso and western Pará with the construction of the BR-163 Cuiabá-Santarém highway in 1971-1976.

Mining also expanded during this period. Industrial-scale mining was driven by the state-owned Companhia Vale do Rio Doce. Vale (as the company is known today) took over development of the Carajás mineral deposits from US Steel in the late 1970s to create the world's largest iron ore mine (Figure 6.1),[52] whose operations are powered principally by the Tucuruí hydroelectric dam, constructed on the Tocantins River in 1975-1984. Gold mining, meanwhile, will forever be remembered for the gold rush at Serra Pelada, also in the Carajás region, where at its peak in the early 1980s an estimated 100,000 men swarmed a giant open pit, seeking their fortunes in metal clawed from the earth.

[52] Financing for the Carajás Iron Project came from the World Bank, the Brazilian National Development Bank (BNDE, today BNDES), the European Community, Japan, and eventually also American commercial banks and the USSR (Antoni 2010; Vale 2012). The world's largest iron mine was thus developed with investments by a virtually complete list of the financial capitals of the global industrial core.

Figure 6.1: Part of the Carajás mining complex seen from the air, 28 July 2014.

The expansion of the agricultural frontier in the Amazon entailed an upheaval in property relations in the region. The initial colonial occupation occurred through land grants and concessions, but agrarian legislation passed prior to independence in 1822 recognized private land rights accrued through occupation and effective use (*posse*), allowing for the establishment of independent land claims on undesignated state lands (*terra devoluta*) (Schmink and Wood 1992, 42). By the end of World War II, there was a long history of often overlapping land claims by both small and large landholders in the Amazon. The military government, on coming to power, seized control over vast areas of land from the Amazonian states and sought to facilitate the distribution of land to private investors. Far from creating a regular, modernized tenure regime in the Amazon,

the interventions of the military government intensified the tenurial chaos in the region, for several reasons. First, the cadastral optic of agrarian tenure was layered over past extractivist land claims such as the aforamentos, and federal development programs clashed with elites such as brazil nut concessionaires (*foreiros*) who sought to maintain and expand their control of land (Schmink and Wood 1992, 65–66). Second, the military's promotion of agriculture and ranching was beset by an internal tension between support for smallholder colonization programs and promotion of large-scale ranching and agro-industrial investments. As Schmink and Wood observe, "The crux of the matter was the incompatibility between two opposing sets of priorities. On the one hand, there was an emphasis on private property and on incentives to capital accumulation and technological change; on the other, there were the provisions for state intervention to reduce poverty and to make land available to those who worked it. The contradiction lay at the heart of the so-called 'agrarian question'" (Schmink and Wood 1992, 61) and generated a highly contentious agricultural frontier characterized by a mixture of actors and land uses. Third, existing structures of power and patronage in the Amazonian extractive regime and the advent of new, capitalized private investors to the rapidly expanding frontier created a fertile environment for corruption, rent-seizing, and all manner of plunder.

The developmentalist interventions of the military government failed to transform the Amazon from a zone of extraction to a zone of productivist modernization. Instead, the extractive regime in the Amazon was reconfigured during the 1970s and 1980s through the rise of a new extractive elite of large ranchers (*fazendeiros*) and land-grabbers (*grileiros*), who ruled the '*Faroeste*' (Wild West) of the Amazonian frontier through networks of corruption and patronage and waged 'land wars' with hired guns to dispossess small farmers, indigenous peoples, and

extractivist communities (Simmons et al. 2007). Land titles were multiple times forged or fraudulently issued and subsequently revoked, and SUDAM became a vehicle for corruption.

One emblematic figure at the national level among the corrupt Amazonian elite is Jader Barbalho, who since the 1970s has served two terms each as federal deputy, senator, and governor of Pará. (He is currently serving his second term as senator.) Barbalho owns a newspaper and part of a TV station in his home state, and since democratization has been a supporter of the Sarney, Franco, Cardoso and Lula governments. He has also been accused of massive corruption linked to the operation of SUDAM in Pará, where he allegedly coordinated the diversion of over a billion reais, and probably an amount several times greater, almost certainly exceeding US$1 billion (Brasiliense 2005; *O Globo* 2010). Barbalho was forced to resign from the Senate in 2001 in the midst of the SUDAM corruption scandal, yet he has continued to be elected to national political offices, and today he is again under investigation for corruption, in particular related to the construction of the Belo Monte hydroelectric dam on the Xingu River in Pará (M. C. Carvalho 2016). Closer to the ground, in the ranching sector, a typical example of the extractive elite is the logger and rancher João Cleber de Souza Torres, whose properties have been embargoed by the federal government for illegal deforestation, who is widely believed to have ordered the killings of multiple people in land disputes (Simionato 2003), and who in 2012 was elected mayor of São Félix do Xingu. His brother and accomplice, Francisco Torres de Paula Filho (known as 'Torrinho'), was Municipal Secretary of Administration and Planning in João Cleber's administration and in 2014 was elected president of the Rural Producers' Syndicate (SPR), the association representing large ranchers in São Félix.

INPE (1989) estimates that in 1975 only 0.6 percent of the Legal Amazon[53] had been deforested (cf. Moran 1993), and Skole and Tucker (1993) estimate that in 1978 just 1.9 percent of the original forest area of the Brazilian Amazon had been cleared. Between 1978 and 2004, when deforestation peaked, roughly 600,000 km^2 of forest were cleared, an area larger than metropolitan France. Cattle ranching, the land use that occupies an estimated 60-80 percent of this deforested land (Margulis 2004; Embrapa 2011; Sy et al. 2015), was established in an extractive mode reinforced by speculation. The productive value of the herd in Amazonian ranching operations is often secondary to the ability to profit from future land sales and government tax breaks and subsidies (Bowman et al. 2012). Where the exchange value of land far exceeds its productive value, land managers have few incentives to invest in sustainable practices (Hecht 1985). Ranchers consolidate large properties, frequently through coercive or illegal land grabbing, extract the fertility of deforested land through unmanaged or excessive grazing, and then as pastures become degraded they move on to grab and clear new areas (Rodrigues et al. 2009). From the mid-1980s, cattle ranching also became widespread among smallholders (Poccard-Chapuis et al. 2001; Smeraldi and May 2008), intensifying cycles of land degradation and frontier expansion. Insecure land tenure, especially for smallholders, constituted a further factor promoting deforestation (to establish ownership through 'productive use') and inhibiting agricultural intensification (by hindering credit access and discouraging capital investments) (Alston, Libecap, and Mueller 1999; W. Jepson 2006b).

[53] The Legal Amazon is an area designated by the Brazilian Government for the purpose of regional policy, initially defined in tandem with the establishment of SPVEA, and currently includes the present-day states of Acre, Amapá, Amazonas, Mato Grosso, Pará, Rondônia, Roraima, Tocantins, and the western part of the state of Maranhão. The Amazon Biome as designated by the Brazilian Institute for Geography and Statistics (IBGE) covers the majority of the Legal Amazon, though substantial portions of the states of Mato Grosso, Tocantins, and Maranhão are designated as falling within the Cerrado (savanna) biome. See also Chapter 2.

The extractive regime in the Brazilian Amazon persisted throughout the second half of the 20th century, coopting, redirecting, and obstructing external attempts to promote productivist modernization. Networks of patronage and corruption, a lack of tenurial clarity, and the frequent use of violence allowed powerful actors to extract windfall profits through primitive accumulation and dispossession of indigenous and traditional populations and small farmer colonists in an atmosphere made more contentious by policy reversals and contradictions. This extractive regime enriched loggers, ranchers, miners, and land grabbers at a cost of deforestation, land degradation, and dispossession, without supporting regional socio-economic development. Nonetheless, the 'underdevelopment' of the Amazon, as Bunker (1985) observed, was integrally linked with the productivist development of the Brazilian core regions of the South and Southeast, and later the Center-West, as well as growth in the industrialized Global North.

Feeding the Productivist Core

The end of the transatlantic slave trade to Brazil in 1850 coincided with political upheaval in Europe, and from the mid-19th century through the early 20th century Brazil attracted waves of immigration from Germany and Italy, and subsequently also from Japan in the 1920s-1930s. Immigration was initially linked to providing labor for coffee plantations, especially in São Paulo State, but immigrants also established farming colonies in the more sparsely populated South Region (in the states of Rio Grande do Sul, Santa Catarina, and Paraná). These waves of immigration helped transform the political economy of southern Brazil from an agro-export platform to something more similar to a settler colony, as immigrants carved out livelihoods as yeoman farmers and businesspeople. The 1960s and 1970s were a period of rapid mechanization and intensification of agriculture in southern Brazil, driven particularly by the expansion of soy, which was increasingly in demand for animal feeds in Europe and North America (Fearnside

2002). The industrialization of agriculture in the South and Southeast displaced hundreds of thousands of small farmers, giving impetus to colonization programs in the Amazon and leading eventually to the founding of the Landless Workers' Movement (*Movimento dos Trabalhadores Sem Terra* – MST) in 1984. Cattle ranching had been the principal agricultural land use in the Brazilian backlands since the 16th century, as it knit together the plantation economies of the Atlantic coast with the mining regions of the interior (Burns 1993, 71–75). With the expansion of industrial field cropping into former pasture areas in South and Southeast Brazil, cattle production in those regions intensified and extensive ranching was displaced towards the Amazonian frontier (cf. Arima et al. 2011; Martha, Alves, and Contini 2012).

Agricultural intensification in southern Brazil since the 1970s has resulted in land sparing at the regional level. Barretto et al. (2013) find that under conditions of land scarcity in the consolidated agricultural zones of the Brazilian South and Southeast, intensification of pastures and cropland was associated with stable or declining agricultural area from 1975-2006, while in the frontier zones of central and northern Brazil, intensification coincided with agricultural expansion. Land sparing in the Brazilian core has driven a regional forest transition in the Atlantic Forest biome, but Walker (2012) demonstrates that this regional transition belies aggregate forest loss through displacement of deforestation to the Amazon region. Agricultural intensification in southern Brazil articulated with broader processes of industrialization to produce the 'Brazilian economic miracle' of the 1960s and 1970s. The rapid growth and industrialization of the Brazilian core relied on the 'internal colony' (Hechter 1975) of the Amazonian periphery (contra Cleary 1993). Colonization of the Amazon served to relieve social pressures brought about by poverty and dispossession in the southern core and the stagnant Northeast, while energy and materials extracted from the Amazon in the form of timber, metals, electricity, and cattle supported industrial

investments and growth in the core. Amazonian extraction also fed productivist growth in the Global North, both directly through exports of Amazonian resources and indirectly through relations mediated by the Brazilian core. From 1971 to 1980, annual exports from Brazil more than quintupled, growing from under $4 billion to over $20 billion, driven especially by exports of soy, iron, and machinery (Simoes and Hidalgo 2011), and trade grew from 14.6 to 20.4 percent of GDP (The World Bank 2017). The 'intensive frontier' of productivist industrial agriculture, led by soy cultivation, expanded into the Cerrado biome in the Center-West during the 1980s and 1990s (Fearnside 2002), with continued strong effects on Amazonian deforestation (cf. Arima et al. 2011; Richards, Walker, and Arima 2014). Displacement effects of productivist development are discussed further in Chapter 7.

Forest Conservation in the Amazon: Protected Areas and Socio-Environmentalism

While the political economy of the Amazon through the end of the 20th century was geared towards extraction, there were nonetheless attempts by various coalitions to conserve forest areas and to moderate extractive expansion, especially as deforestation accelerated after 1975. Forest conservation efforts during the 20th century operated largely within a protected areas model. Protected area creation in Brazil, as elsewhere, developed initially under a Western "cult of the wilderness" ideology (Martínez-Alier 2002) through which scientists and environmentalists interested in wilderness conservation found common cause with state efforts to control people and resources. The Brazilian Government began to create protected conservation areas after the promulgation of the first Federal Forest Code in 1934,[54] and the earliest designations were made in the Atlantic Forest region, where protection of forested mountainsides also served important

[54] The 1934 Forest Code was replaced by the military government in 1965. The 1965 Forest Code remained in effect until a revised Forest Code was passed in 2012.

hydrological functions by limiting erosion and regulating stream flow. The Getúlio Vargas government declared a national forest area in São Paulo State in 1934 and Brazil's first national park, between Rio de Janeiro and Minas Gerais States, in 1937. The first national park in the Amazon biome, Araguaia National Park in present-day Tocantins, was created in 1959, followed by the designation of Xingu National Park in 1961, which was subsequently converted into an indigenous territory. Protected area creation expanded dramatically during the 1970s and 1980s, during which time the National System of Conservation Areas (*Sistema Nacional de Unidades de Conservação* – SNUC) was developed, and several large parks were declared in Amazonas State during this period. When The Nature Conservancy entered Brazil in the early 1990s, opening its first South American office in Brasília in 1994, its activities were primarily related to the USAID-funded 'Parks in Peril' program aimed at improving protected areas management.

Protected area creation in Brazil contains a number of different designations in addition to national parks and has developed through historical processes driven by several different assemblages. Strictly-protected conservation areas – including National Parks, Biological Reserves, and Ecological Stations – correspond to the cult-of-the-wilderness model. 'Sustainable use' conservation areas and indigenous territories (which have a distinct legal status that developed during the early 20th century and was consolidated in the 1973 Indian Statute – *Estatuto do Índio*) allow occupation by local or indigenous populations, and their creation has generally resulted from advocacy by coalitions of local and indigenous people, indigenous rights and environmental NGOs, and government indigenous and environmental agencies (Hecht and Cockburn 1989). Prior to the 2000s, strictly-protected areas in the Amazon were located mainly in remote regions far

from the deforestation frontier, whereas indigenous territories and sustainable use areas were often created in direct response to frontier expansion (Veríssimo et al. 2011).[55]

Sustainable use conservation areas such as Extractivist Reserves (*Reservas Extrativistas* – RESEX)[56] and Sustainable Development Reserves were the product of the socio-environmentalist movement that coalesced in Brazil in the 1980s. In 1981, the federal government began work on the Polonoroeste project, a development program to pave the BR-364 highway to Porto Velho in Rondônia and provide infrastructure for colonization areas. World Bank financing for the project included provisions for the protection of indigenous territories and conservation areas. The immediate effects of Polonoroeste included a surge of new migrants to the southwestern Amazon and corresponding jumps in deforestation and the invasion of indigenous lands and conservation areas. Anthropologists working with indigenous peoples in the region spoke out against the project, and their protest was joined by environmentalists in the United States who were seeking to use lending from multilateral development banks (MDBs) as a lever to affect environmental issues in the Global South (Keck and Sikkink 1998, 135–38). The environmentalist campaigners succeeded in prompting the US Congress to hold hearings on MDB lending practices, which led to Congressional recommendations aimed at strengthening the banks' environmental policies. In 1985, the World Bank suspended funding for Polonoroeste due to the violation of conditions for the protection of indigenous territories and conservation areas.

In Acre, to the west of Rondônia, rubber tappers under the leadership of Chico Mendes had been organizing since the mid-1970s, largely in the context of the Brazilian labor movement, in order to defend their livelihoods from expanding cattle ranching. Following the intense

[55] I use the term 'protected areas' hereafter in this chapter to refer generically to strictly-protected and sustainable-use conservation areas and indigenous territories.
[56] *Reserva Extrativista* is usually translated as 'Extractive Reserve,' but in keeping with my usage, which distinguishes between extractivism and extraction, I translate the term literally as 'Extractivist Reserve.'

mobilization against the Polonoroeste project, environmentalist activists focused attention on the Rio Branco-Porto Velho Road Improvement Project, a plan financed by the Inter-American Development Bank for paving of the BR-364 between Rondônia and Acre. Supporters of the Acre rubber tappers and American environmentalists formed an alliance, and at the first meeting of the National Council of Rubber Tappers (*Conselho Nacional dos Seringueiros*) in 1985 a proposal was put forward for the establishment of Extractivist Reserves in the Amazon. The reserves, partially inspired by indigenous territories, would guarantee tappers' use of the land and ensure the protection of the forest. Chico Mendes' visit to Washington, DC in 1987 and his subsequent assassination in 1988, coupled with growing public concern over destruction of Amazonian forests, helped popularize the rubber tapper cause and establish the framing of rubber tappers' struggle to preserve their livelihood in environmentalist terms (Keck 1995).

The struggle around Polonoroeste and the alliance between environmentalists and the rubber tappers' movement consolidated a discourse of socio-environmentalism (*socioambientalismo*) in Brazil that linked forest conservation with the livelihoods of local peoples (Hochstetler and Keck 2007).[57] Socio-environmental advocacy was further enabled by Brazil's democratic opening, which was marked by return to civilian rule in 1985 and the promulgation of a new democratic constitution in 1988. Prior to the 1980s, virtually all protected areas had been designated by the federal government, but after 1985 the Amazonian states also began to create conservation areas (Veríssimo et al. 2011). The first Extractivist Reserves were created in Acre, Amapá, and Rondônia in 1990, and in 1992 Brazil hosted the UN Conference on Environment and Development in Rio de Janeiro, which helped consolidate global sustainable development

[57] Socio-environmentalism is an example of the environmentalist discourse that Martínez-Alier (2002) terms 'environmentalism of the poor.'

discourse and strengthened environmentalist advocacy in Brazil and linkages between Northern and Southern environmental NGOs. The Pilot Program to Conserve the Brazilian Rainforest (PPG7), a multilateral cooperation program of the G7 countries administered in part by the World Bank, was technically founded in 1990 and became operational in 1994, directing support to protected area creation and environmental governance institutions (Antoni 2010). In 1994, the Brazilian NGO *Instituto Socioambiental* (ISA) was formed out of a network of environmentalist and indigenous rights activists. The first Sustainable Development Reserve was created in Amazonas State in 1996. The socio-environmentalist movement was thus responsible for the proliferation of 'sustainable use' areas within the Brazilian protected areas system, and socio-environmentalist coalitions played a key role in the dramatic expansion of the Amazonian protected areas network in the mid-2000s, though I argue that socio-environmentalism was secondary to the land sparing complex in engineering the Amazonian land use transformation that took shape after 2004.

From Remote Preserves to 'Green Barriers'

Globally, neoliberalization of environmental governance during the 1990s and 2000s shifted mainstream environmentalism from the cult of the wilderness towards a focus on ecosystem services and multifunctional landscapes. TNC was one of the organizations spearheading this shift (e.g., Kareiva, Marvier, and Lalasz 2012), which entailed new articulations between environmentalists, state territorial interests, and capitalist interests. A neoliberal protected areas complex emerged that linked protected areas to capital accumulation for an assemblage centered on the natural resources and tourism sectors, financial capital, and environmental NGOs. The emerging linkages of protected areas to this fraction of capital under the protected areas complex is evident in Brazil through initiatives such as payments-for-ecosystem services in Juma

Sustainable Development Reserve, created in 2006 (V. Viana et al. 2008); private forestry concessions in National Forests, legalized in 2006; and a public-private agreement promoting tourism in federal conservation areas, signed in 2009 (Veríssimo et al. 2011).

By 2002, nearly 650,000 km^2 in the Amazon had been designated to state or federal conservation areas. In the ensuing four years, almost 500,000 km^2 of new state and federal conservation areas were designated (Veríssimo et al. 2011, 24). This explosion in protected area creation was due not primarily to the protected areas complex or socio-environmentalist advocacy, but rather to the integration of protected areas into the land sparing complex, which reorganized the territorial and accumulative logics of protected area creation.

The protected areas complex links environmentalist interests in biodiversity conservation with state interests in territorialization and capitalist interests in primitive accumulation *within* forest reserves. Under the land sparing complex in the Brazilian Amazon, the spatial logic is inverted. Forest conservation results from complementarity of biodiversity and ecosystem services conservation with state interests in territorialization and capitalist interests in accumulation *outside* forest reserves, through territorial constriction and agricultural intensification. This new spatial logic drove a geographic shift in Amazonian protected area creation. Prior to 2003, strictly-protected conservation areas were primarily located in remote regions, but after 2003 new conservation areas have been located principally in areas of high deforestation pressure, where they operate as "green barriers" to deforestation (Soares-Filho et al. 2010). Although enclosure and primitive accumulation persist as capitalist interests in protected areas, the dominant logic of protected area creation has become territorial constriction under the land sparing complex.

Emergence of the Land Sparing Complex

The expansion of extractive peripheries and productive centers is a fundamental dynamic of capitalism (Bunker 1985; Moore 2000). While the Amazon remained largely an extractive periphery until the 2000s, the Brazilian state since World War II has been controlled by a developmentalist regime promoting productivist modernization. Following the democratic transition in the 1980s, the socio-environmental movement gained strength, and the Brazilian Public Ministry, a body of independent prosecutors, was restructured to become a proponent for environmental law enforcement (McAllister 2005). Multiple structural and conjunctural factors then converged in the mid-2000s to align opponents of the extractive economy, including local populations, environmentalists, and productivist elements of the Brazilian government and transnational capital, who assembled the land sparing complex as a political-economic and environmental project to transform the political-economic regime of the Amazon from extraction to productivism.

Structurally, infrastructure spending, agricultural research, and global commodity-chain development brought industrial soy and cattle production to the southern and eastern Amazon. The increasing role of corporate agribusiness in Amazonian land change alarmed environmentalists and the Public Ministry, who began to exert pressure down global supply chains to control deforestation (Nepstad, Stickler, and Almeida 2006). Mainstream environmental NGOs had corporatized during the 1980-1990s, adopting neoliberal modalities of 'partnership' with governments and corporations that facilitated a "politics of agreement" among powerful actors (Hecht 2011, 7). Critically, remote sensing and GIS technology for monitoring deforestation had advanced during the 1990s, and INPE emerged in Brazil as a center of technological capacity, enabling more active and targeted regulation.

Conjuncturally, land sparing arguments gained prominence in academic discourse in the 2000s. International attention to the role of forests in climate change also grew rapidly, leading to inclusion of REDD in UN climate negotiations in 2005. Domestic concern over climate change heightened in Brazil following the El Niño of 1997-1998 and the Amazon drought of 2005.[58] The inauguration of President Lula in 2003 brought to power an administration with ties to socio-environmental movements, installing rubber-tapper activist Marina Silva as Minister of Environment, but simultaneous alliances with agribusiness demanded a conciliation of environmental protection with agricultural production. Under these conditions, productivist elements in the Brazilian executive linked with environmental and enforcement agencies and NGO and civil society networks to articulate a new environment and development agenda for the Amazon.

Land Sparing in the Amazon: Territorial Constriction and Agricultural Intensification

Land sparing is attractive to a range of powerful actors. Agricultural intensification is favored by agro-industrial corporations because it improves supply-chain productivity and governability, integrates producers into markets for inputs and financial products like credit and insurance, and can bring environmentalist commendation for sustainable production as opposed to condemnation for deforestation. The state favors agricultural intensification because it is associated with higher incomes, better infrastructure, and increased public goods provision (VanWey et al. 2013), which are elements of increased state revenues and capacity (i.e., state-building). Environmentalists favor intensification to reconcile forest conservation with economic

[58] Although from a narrower perspective extreme weather events are conjunctural, the frequency of extreme events is predicted to increase with climate change, which is exacerbated by deforestation. These events are thus also linked to long-term structural changes.

development (Table 6.1). The question is how to stimulate agricultural intensification and avoid the rebound effect in order to decouple agricultural development from deforestation.

On agricultural lands in the Brazilian Amazon, two forms of intensification predominate: intensification of cattle ranching through practices such as improved pasture management, and intensification via transition in techno-managerial system from ranching to industrial field agriculture (cf. Laney 2002). Other forms of intensification exist also, for instance through diversification of smallholder production with cacao agroforestry. Ranching intensification and pasture-to-cropland conversions are the most important forms of intensification for the Amazonian land use transition, however. As the contrast between land change trajectories in the Atlantic Forest and Amazon biomes illustrates, crop and pasture intensification under conditions of land scarcity may result in land sparing, while intensification on open frontiers may drive further agricultural expansion (Walker 2012; Barretto et al. 2013). Land scarcity, or territorial constriction that produces land scarcity, is a key variable interacting with agricultural intensification to determine land cover change. Intensification does not automatically spare land for nature, but when intensification occurs in conjunction with territorial constriction through forest protection, it may deliver increasing agricultural production concurrent with decreasing deforestation (Phalan, Balmford, et al. 2011), at least at the regional level. The land sparing strategy developed in the Brazilian Amazon relies primarily on territorial constriction to both stimulate intensification and avoid agricultural land expansion.

Territorial Constriction and Agricultural Intensification

The territorial character of Brazilian forest governance has been discussed by other scholars. Nepstad et al. (2014) describe post-2008 governance as a "territorial performance" approach, but their usage is limited to distinguishing municipal-level ('territorial') interventions

from policies targeting farmers individually. A more developed treatment of the territorial character of Amazonian governance considers 'territorial ordering' (*ordenamento territorial*), a discourse deployed by the federal government to orient landscape-level development and conservation planning. Baletti (2012) analyzes territorial ordering as a re-territorialization of the Amazon that reconciles environmentalism with developmentalism under 'green capitalism.' Nonetheless, she does not discuss the linkage of territorial ordering with the creation of land scarcity through territorial constriction as a strategy for supporting agricultural intensification.

Territorial constriction, i.e., land scarcity within a bounded terrain (cf. Elden 2010), is fundamental to interrelated processes of state-building and agricultural intensification. Circumscribed agricultural land has historically been a condition for emergence of institutionalized hierarchies that are the foundation of the state (Carneiro 1970), while constriction is also a primary driver of intensification. In Boserup's (1965) classic model, rising population on limited land impels farmers to increase output per unit area. While in the classic model intensification occurred through increasing labor inputs, with decreasing output per unit labor, industrial agriculture relies heavily on capital investments to increase both agricultural yield and labor productivity. Capitalist growth rests on twin foundations of primitive accumulation and productivity gains. Where primitive accumulation through frontier expansion is limited by territorial constriction, investments in intensification to support continued growth may follow, driving a transition to a productivist economy.

Land scarcity is not the only stimulus for intensification, nor is intensification the only response to land scarcity (G. Stone and Downum 1999). Nonetheless, the 'induced intensification thesis' that land constraints drive intensification is valid in many contexts (Turner and Ali 1996; Laney 2002). Intensification may exacerbate social stratification as those able to make larger

investments in productivity improve their relative socio-economic position (Turner and Ali 1996), while social stratification and state development feed back into intensification as dominant groups extract surplus from their subjects (Carneiro 1970).

Territorial constriction can therefore operate as a political-economic strategy for socio-economic development and state-building. In addition to state, environmentalist, and corporate interests in intensification resulting from territorial constriction, constriction *per se* is attractive to the state because it territorializes by fixing the population in space; to environmentalists because it conserves forest by halting agricultural expansion; and to some agricultural capitalists because scarcity may increase land values (Table 6.1).[59] The land sparing complex thus inverts the logic of the protected areas complex, shifting focus to the agricultural zone 'outside the box' of protected areas.

Table 6.1: Actors and Interests in Amazonian Land Sparing

		Interests in Land Sparing Policy		
		territorial constriction	**agricultural intensification**	**forest conservation**
Core Land Sparing Complex Sectors	**State**	Legibility and control	Revenue and infrastructure	Natural capital and ecosystem services
	Agro-industrial capital	Increasing land values	Productivity and supply chain integration	Ecosystem services
	Environmental NGOs	Forest conservation	Green development	Biodiversity and ecosystem integrity

PPCDAm

In 2004, the federal government launched the 'Action Plan for the Prevention and Control of Deforestation in the Legal Amazon' (PPCDAm), bringing activities of 13 federal ministries under coordination of the President's Office. Under PPCDAm, anti-deforestation efforts

[59] I owe the point regarding land values to Gustavo Oliveira.

developed along three axes (IPEA, CEPAL, and GIZ 2011): 1) 'territorial ordering,' including protected area creation and land tenure regularization; 2) monitoring and enforcement, including enforcement of the Federal Forest Code, which required preservation of areas of natural vegetation on rural properties; and 3) support for sustainable production, including technical assistance and financing for agricultural intensification. Protected area creation and Forest Code enforcement anchored the land sparing complex with territorial constriction, while support for sustainable production and tenure regularization would facilitate land sparing intensification (Figure 6.2). As farmers and ranchers have begun to feel territorially constrained, an extractive coalition represented by the 'ruralist bench' of the Brazilian Congress has pushed back with a revision of the Forest Code in 2012 and efforts to weaken protected areas.

In a typical neoliberal modality, government policies of PPCDAm form the backbone of environmental governance, while mechanisms for implementing these policies frequently rely on non-state actors. Implementation of PPCDAm has thus catalyzed and structured the assembling of the land sparing complex. I describe the regional-level development of PPCDAm strategies through the emergent land sparing complex before moving to state and municipal case studies illustrating implementation of these strategies on the ground by land sparing coalitions.

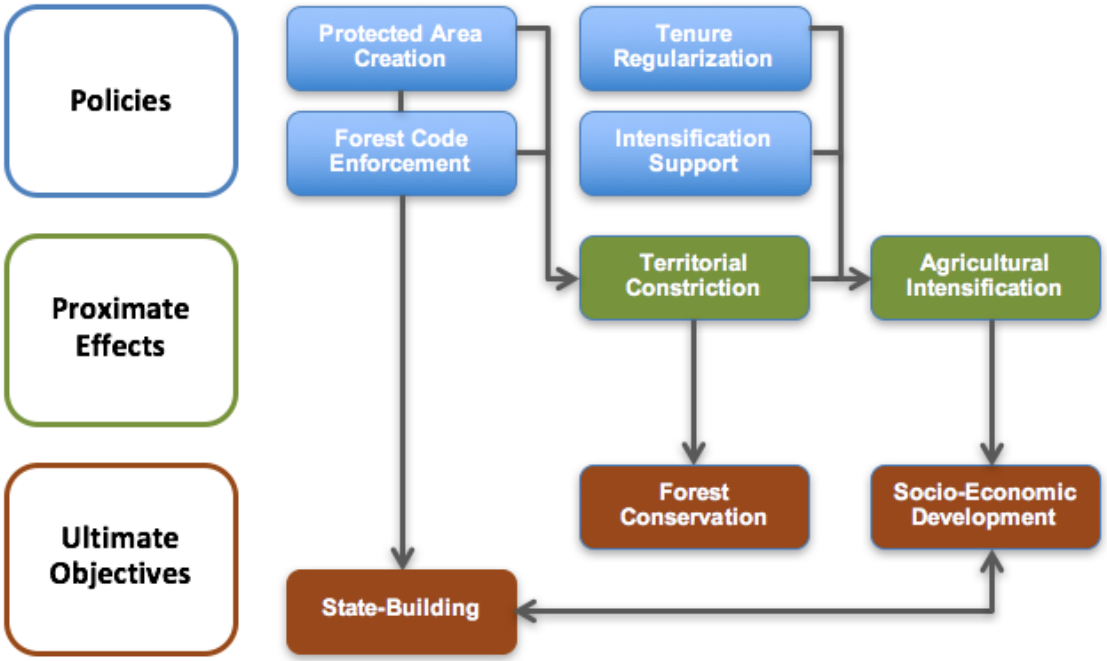


Figure 6.2: The Brazilian Land Sparing Model. This model depicts the simplified, ideal relationships motivating land sparing advocates. Protected area creation and Forest Code enforcement contribute to state-building through territorialization and produce territorial constriction. Territorial constriction guarantees forest conservation while inducing agricultural intensification, which is also supported by tenure regularization and agricultural policy. Agricultural intensification catalyzes socio-economic development, and development and state-building are mutually reinforcing.

Protected Area Creation

In 2004-2007 under PPCDAm, nearly 20 million hectares of new conservation areas were created, primarily in zones of high deforestation pressure in the eastern Amazon. Protected area creation in the Terra do Meio region of Pará, between São Félix and Novo Progresso, was driven by a socio-environmental coalition anchored by smallholder farmers, who sought to halt the expansion of large-scale ranches. The planning process for Terra do Meio was facilitated by domestic and international environmental NGOs, including Instituto Socioambiental, Greenpeace, and the Woods Hole Research Center (Campos and Nepstad 2006; S. Schwartzman et al. 2010). During the same period, indigenous peoples and activists secured designation of 10 million

hectares of indigenous territories. These new protected areas act as 'green barriers' to agricultural expansion. In contrast to Indonesia, protected area status in Brazil (particularly strictly-protected status or designation as an indigenous territory) substantially reduces the likelihood of deforestation (Nolte et al. 2013), and Soares-Filho et al. (2010) estimate protected area creation was responsible for 37 percent of the decrease in Amazonian deforestation in 2004-2006.

Forest Code Enforcement

The military government had passed a new federal Forest Code in 1965, which was subsequently modified by presidential decrees. At the beginning of the 2000s, the Forest Code required rural landowners to maintain 'permanent protection areas' along water courses and on steep slopes and to maintain an additional percentage of the property as a 'legal reserve' of natural habitat, which in the Amazon biome was set to 80 percent of the property area (Figure 6.3). These requirements went largely unenforced, such that by 2012, achieving compliance would have required restoration of 50 million hectares nationally (Soares-Filho et al. 2014). Under PPCDAm, the federal government intensified Forest Code enforcement, effecting territorial constriction on private properties through enhanced deforestation monitoring and enforcement and development of environmental registration systems to regulate property-level compliance.

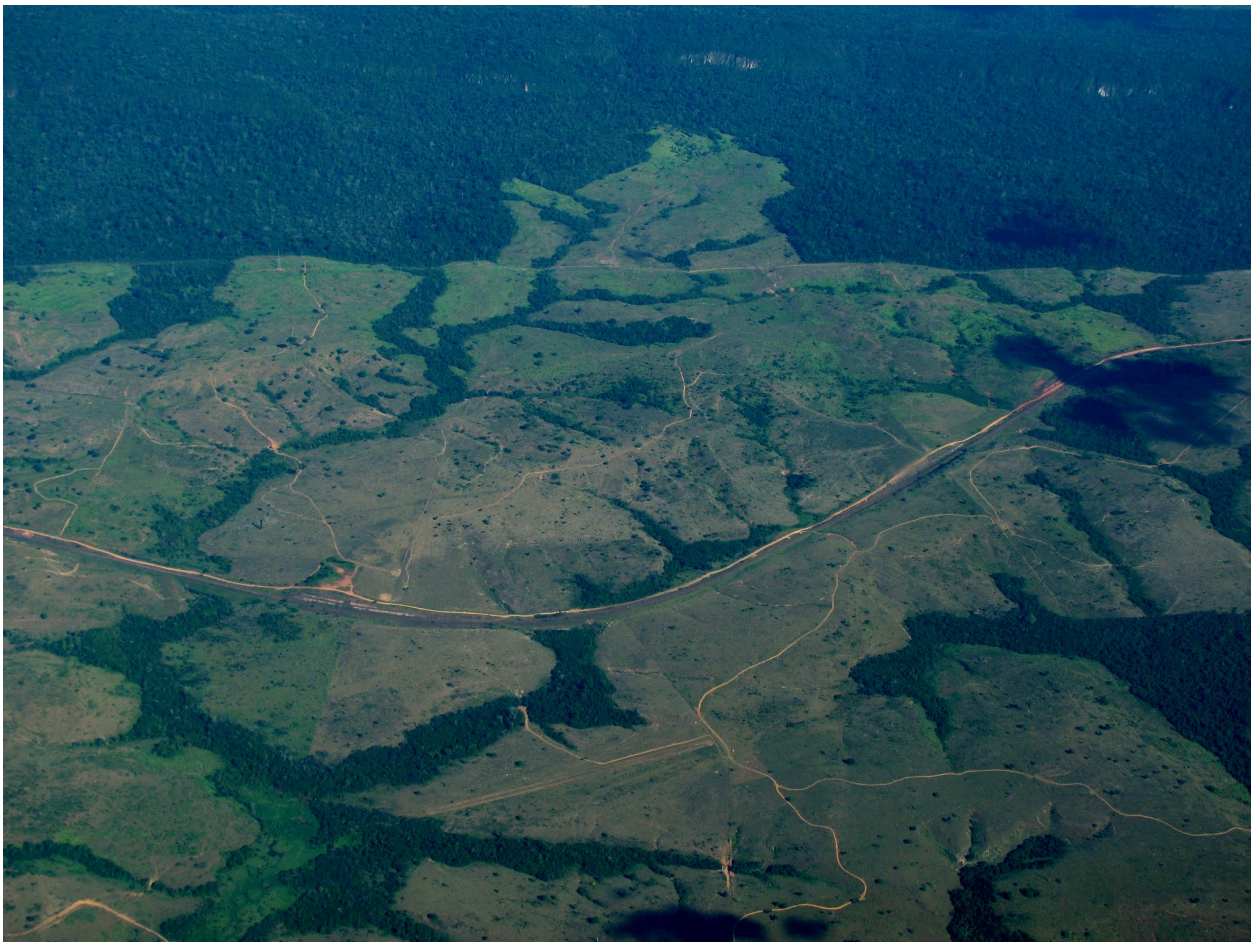


Figure 6.3: Pastures and forest in southeastern Pará show the landscape created by Forest Code compliance, with permanent protection areas of forest along watercourses and larger blocs of forest that could be a legal reserve or protected area, 18 July 2014.

The Rural Environmental Registry (CAR) exemplifies the close but contingent and sometimes conflictual interactions between Brazilian municipal, state, and federal governments, NGOs, and corporations in environmental governance. CAR developed out of the System for Environmental Licensing of Rural Properties (SLAPR) in Mato Grosso, a registry funded by international donors for managing environmental licensing with remote sensing and GIS (Rajão, Azevedo, and Stabile 2012). In 2006, spurred by a Greenpeace campaign, transnational soy traders agreed to a moratorium on purchasing soy from newly-deforested areas in the Amazon. The Soy Moratorium and environmentalist pressures motivated the municipal government of Lucas do Rio

Verde (Lucas) in Mato Grosso to partner with The Nature Conservancy to pursue environmental compliance, including SLAPR registration of all rural properties. The Lucas project began in 2006, but in 2008 the federal environmental enforcement agency (IBAMA) fined landowners in Lucas for violations. The fines damaged the project's credibility with producers and led to lobbying by municipal leaders, TNC, and the state environmental agency, culminating in a state law creating CAR in Mato Grosso (Rausch 2013, 263–64). CAR divided environmental licensing into parts: producers first voluntarily register their properties with state environmental authorities through CAR and then are granted a period to achieve compliance without incurring fines for past illegal clearing.

CAR spread regionally and nationally. In 2008, the Ministry of Environment (MMA) published a 'priority list' of Amazonian municipalities for combating deforestation that subjected priority municipalities to strict monitoring and enforcement. A requirement for exiting the list became completion of CAR in 80 percent of a municipality's private property area.[60] TNC, other NGOs, and the federal government developed CAR registration programs across the Amazon, and in 2009, under pressure from environmentalists and public prosecutors, meatpacking corporations in the Amazon began requiring CAR from producers in order to purchase their cattle. Pará launched a Green Municipalities Program in 2011 to encourage CAR registration, and at the federal level, CAR entered the 2012 Forest Code revision as a requirement for all rural properties in Brazil. Assunção, Gandour, and Rocha (2012) find overall that new conservation policies avoided over 62,000 km^2 of deforestation in 2005-2009, while Arima et al. (2014) estimate that policies targeting priority municipalities avoided over 10,000 km^2 of deforestation in 2009-2011.

[60] The other requirements were a municipal deforestation rate of less than or equal to 40 km^2 per year and a two-year average annual deforestation rate less than or equal to 60 percent of the average of the previous two-year period (MMA 2009).

Tenure Regularization

Secure land tenure is a foundational institution of productivist regimes (Acemoglu, Johnson, and Robinson 2001; Lawry et al. 2017). Tenure regularization contributes to state-building, but in relation to land sparing constriction and intensification, land titling functions to enable agricultural intensification. In 2009, the Brazilian Government launched the *Terra Legal* (Legal Land) program to support titling for Amazonian settlers. This program was a late addition to PPCDAm, and its performance has been weak. Against a goal of titling nearly 150,000 properties, by November 2015 fewer than 20,000 titles had been issued (IPEA, CEPAL, and GIZ 2011; Ministério do Desenvolvimento Agrário 2015). While many actors hoped environmental registration through CAR might facilitate tenure regularization, the spread of CAR has not yet resulted in accelerated titling. Some NGOs have sought to support tenure regularization, but titling depends on the government and NGOs have made little headway.

While tenure regularization is an enabling condition for agricultural investment (W. Jepson 2006b), it is neither sufficient for intensification (Futemma and Brondízio 2003) nor absolutely necessary. Formal title is one indication of tenure security, but untitled producers, especially large landholders, may have fairly secure tenure even without possessing legal title (J. Campbell 2015b), and therefore may still respond to constriction through investments in intensification. Agricultural credit is not necessarily dependent on definitive title, and smaller producers who lack title but have completed CAR may receive financing. Tenure regularization has thus far done little to encourage intensification at the regional level in the Amazon, and insecure tenure remains a barrier to investment.

Support for Sustainable Production

The final axis of PPCDAm is support for 'sustainable production,' including agricultural intensification. In 2011-2014, the Brazilian Government provided $2.7 billion in credit through its Low-Carbon Agriculture Program (ABC) to support activities such as restoration of degraded pastures and integrated ranching-cropping-forestry systems (Observatório ABC 2014). The federal agricultural research corporation, Embrapa, promotes ranching intensification through improved pasture management and environmental compliance, and the executive's Secretariat for Strategic Affairs (SAE) has sought to develop a ranching intensification credit line.

Meanwhile, environmental NGOs have expanded beyond their focus on natural areas to support ranching intensification and agricultural production on degraded lands. Brazilian NGO Instituto Centro de Vida supports ranching intensification in northern Mato Grosso, with funding from Fundo Vale, the foundation of Brazil's Vale mining company. In São Félix, TNC has developed a Sustainable Beef project, supported by meat processor Marfrig and retailer Walmart, and a Cargill-funded program promoting cacao agroforestry on degraded lands.

In general, however, support for sustainable production and tenure regularization, the two strategies facilitating agricultural intensification, have had weaker implementation than policies supporting territorial constriction. The state and municipal-level incorporated comparisons demonstrate how this weakness results in a partial land use transition that may realize land sparing goals incompletely and unevenly. Land sparing policies have effected institutional change and increased the productivist quotient of the Amazonian economy, but because core and periphery are fractal features of the geography of capitalism, uneven development ramifies at the regional and local levels in the Amazon as agro-industry consolidates in some areas while extractive economies persist and sometimes expand in others.

TNC in the Brazilian Amazon

The Nature Conservancy began working in Brazil in the early 1990s, initially with a strong focus on protected areas management. In keeping with the eco-regional approach of Conservation by Design, which was launched in 1995, TNC's activities in Brazil were organized into eco-regional programs with 'biome managers' based in Brasília. These programs coalesced into the Amazon Conservation Program and the Atlantic Forest and Central Savannas Program (AFCS). The Amazon Conservation Program office in Belém was opened in 2003, and the program was especially active in Pará, though given its ostensible responsibility for the entire Amazon region, the program included activities as far-flung as Ecuador and Colombia. AFCS opened an office in Curitiba in 2001, which focused on activities in the Atlantic Forest biome, while a regional office was finally opened in Cuiabá in 2008 to manage activities in the Central Savannas (Cerrado). While AFCS did occasionally work outside of Brazil, notably in Paraguay, it was less regionally active than the Amazon Program (TNC20 140428). The Amazon Biome of northern Mato Grosso represented a gray zone for TNC's programs. While activities in the Amazon were technically the responsibility of the Amazon Conservation Program in Belém, northern Mato Grosso was much closer to the Cuiabá office, which also maintained closer relationships with government, NGO, and corporate actors in the state. Coordination problems abounded.

During 2008, TNC conducted a feasibility study to identify municipalities for REDD pilot projects in Brazil. The study identified Northwest Mato Grosso and the São Félix do Xingu region of Pará, but TNC managers were unable to agree internally on a single pilot project, as the Amazon Program was set on working on the ranching frontier in São Félix but AFCS was eager to have a REDD project in Mato Grosso (TNC12 140409). TNC began working in both locations. In Northwest Mato Grosso, TNC was part of a REDD working group that included Instituto Centro de Vida (ICV), a Mato Grosso NGO, the state environmental agency (SEMA), and the

international arm of the French National Forest Office (ONF International). Their activities eventually came to focus on the municipality of Cotriguaçu, and by 2011 TNC had largely left the REDD initiative to ICV, which has run the *Cotriguaçu Sempre Verde* (Cotriguaçu Always Green) project in the municipality. The Amazon Program trained its primary focus on São Félix, where it began work in 2009 and continues to this day.

In addition to these two municipality REDD pilots, the Amazon Program and AFCS were active in numerous other municipalities in Pará and Mato Grosso, in particular in support of CAR registration and Forest Code compliance. TNC's involvement in CAR is also described in Chapter 4. AFCS and the Amazon Program secured millions of dollars in financing from multiple sources, including PPG7 (administered by the World Bank), Brazil's Amazon Fund (administered by BNDES, the Brazilian development bank), and Fundo Vale (the foundation of the Vale mining company), to work in dozens of municipalities, predominantly those included in the federal government's 'priority list.' Under the project with the Amazon Fund, AFCS returned to Cotriguaçu to support CAR implementation in the municipality. The municipalities of Nova Ubiratã in Mato Grosso and Novo Progresso in Pará were also included in these programs, and comprise my other two municipal case studies in Brazil (Figure 6.4). In Mato Grosso, TNC AFCS staff in the Cuiabá office indicated Nova Ubiratã as the municipality where their program had been most successful, while Cotriguaçu was where they felt they had experienced greatest difficulties. In Pará, Amazon Conservation Program staff in the Belém office indicated São Félix do Xingu, site of their ongoing REDD project, as the municipality where they had achieved the greatest success, while Novo Progresso was the municipality where they had experienced the greatest difficulties. The following sections develop the state and municipal-level incorporated

comparisons, illustrating the differential experiences of land sparing coalitions and land use change across the diverse geographies of the Amazonian frontier.

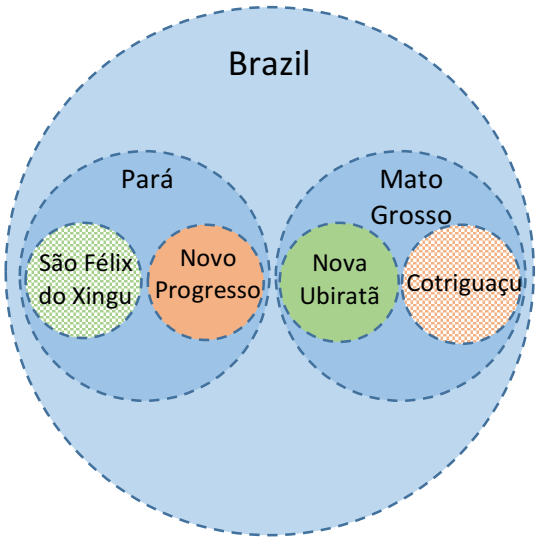


Figure 6.4: Nested case selection for incorporated comparison of tropical forest governance in Brazil. Circles represent the national, state, and municipal levels. Borders at each level are porous. São Félix do Xingu and Cotriguaçu municipalities, which host jurisdictional-level REDD projects, are distinguished by a textured background pattern. Municipalities where TNC employees report their programs most successful are in green; municipalities reported most difficult are in orange.

Part I: Mato Grosso

The State of Mato Grosso lies in the Center West Region of the Brazilian interior and occupies the transition zone between the Cerrado tropical savanna biome in the eastern and southern parts of the state and the Amazon biome in the north and west. (The Pantanal wetlands biome lies in the extreme south of the state.) Cuiabá, present-day capital of Mato Grosso, became a center of gold mining in the 18th century, and extensive cattle ranching connected interior mining areas with the agricultural economies of the southern coast.

Because much of Mato Grosso is a savanna region and historically connected by land with the Brazilian South and Southeast, it has a history somewhat distinct from the general history of

the Amazon Basin presented above. During the 1970s to 1990s, Mato Grosso experienced rapid infrastructure development, population growth, deforestation, and agricultural expansion. SUDECO (the Superintendency for the Development of the Center West) was established in 1967 as the Center West counterpart to SUDAM and supported the establishment of infrastructure and development programs in the region. Construction of the BR-163 highway began in 1971, linking Cuiabá with Santarém on the main trunk of the Amazon and opening a vast new frontier in northern Mato Grosso and western Pará. Both the federal government and private firms launched colonization projects to attract small farmers to the state (W. Jepson 2006a; W. Jepson 2006b; Rausch 2013). At the same time, agricultural subsidies provided by developmentalist programs including Polocentro (the Center West counterpart to Polonoroeste) and the Japanese-financed PRODECER supported the growth of large-scale ranching and row crop cultivation. Research by Embrapa, the Brazilian Agricultural Research Corporation, identified fertilizer and lime applications to counteract the acidity and aluminum toxicity of Cerrado soils and developed new soy cultivars (Spehar 1995; Fearnside 2002). Meanwhile, agricultural intensification in southern Brazil raised land values and dispossessed small farmers, pushing migration and investment into the Center West. These processes drove the coupled soy and cattle frontiers far into northern and western Mato Grosso and transformed the state into the epicenter of Brazil's agro-export economy.

During the 1990s and early 2000s, Mato Grosso was the state with the highest annual deforestation rate in the Amazon, comprising roughly 40 percent of total Amazonian deforestation. Historical deforestation in Mato Grosso is shown in Figure 6.5. Mechanized soy production requires high levels of investment and its expansion in eastern and central Mato Grosso integrated these parts of the state into transnational commodity chains and provided a foundation for articulated agro-industrial development through the provision of infrastructure and inputs and the

production of value-added outputs such as soy meal, biodiesel, pork and poultry, and processed meat products. With the conversion of pasture to row crops and rising land values due to soy expansion, remaining ranching operations in these areas were also forced to intensify. A productivist economy thus emerged behind the Mato Grosso soy frontier.

In the north and northwest of the state, however, an extractive political economy persisted centering on logging, mining, and extensive ranching. Rausch writes that the State Environmental Foundation (FEMA), Mato Grosso's environmental regulatory agency, was "plagued by corruption and inefficiencies…. Therefore, farmers' willingness to comply with its regulations, given that compliance usually came at the expense of profits, was also low. Farmers knew that if they were to be fined (unlikely, in any case, due to the expanse of the state and the few resources available to FEMA agents); the going-rate for a bribe to have the fine disappear was around 10 percent of the total value of the fine" (Rausch 2013, 160–61). The effective payment rate of environmental fines in Mato Grosso was around only 6 or 7 percent (Rausch 2013), and in 2005 the president of FEMA, the superintendent of IBAMA in Mato Grosso, and some 80 other officials, loggers, and timber traders were arrested in a bust of an illegal logging ring. This scandal led to the dissolution of FEMA, which was replaced by the State Environmental Agency (SEMA).

In 2004, the year that deforestation in the state peaked and nearly 12,000 km^2 of forest were cleared, Mato Grosso produced 29 percent of Brazil's soy harvest and supported 13 percent of the national cattle herd (IBGE 2016d; IBGE 2016c). Expanding soy production and rapid deforestation during the late 1990s coincided with the increasing power of soy producers and agro-industrial interests in state-level politics and changes in state-level forest governance institutions. Governance in Brazil was marked by a general trend of decentralization during the 1990s, which included decentralization of some environmental governance responsibilities to the states. The

Mato Grosso State Environmental Code was approved in 1995, and in 1999 the federal government devolved control over forest management and environmental licensing to FEMA, though monitoring and enforcement powers remained with federal agencies (Azevedo 2009).

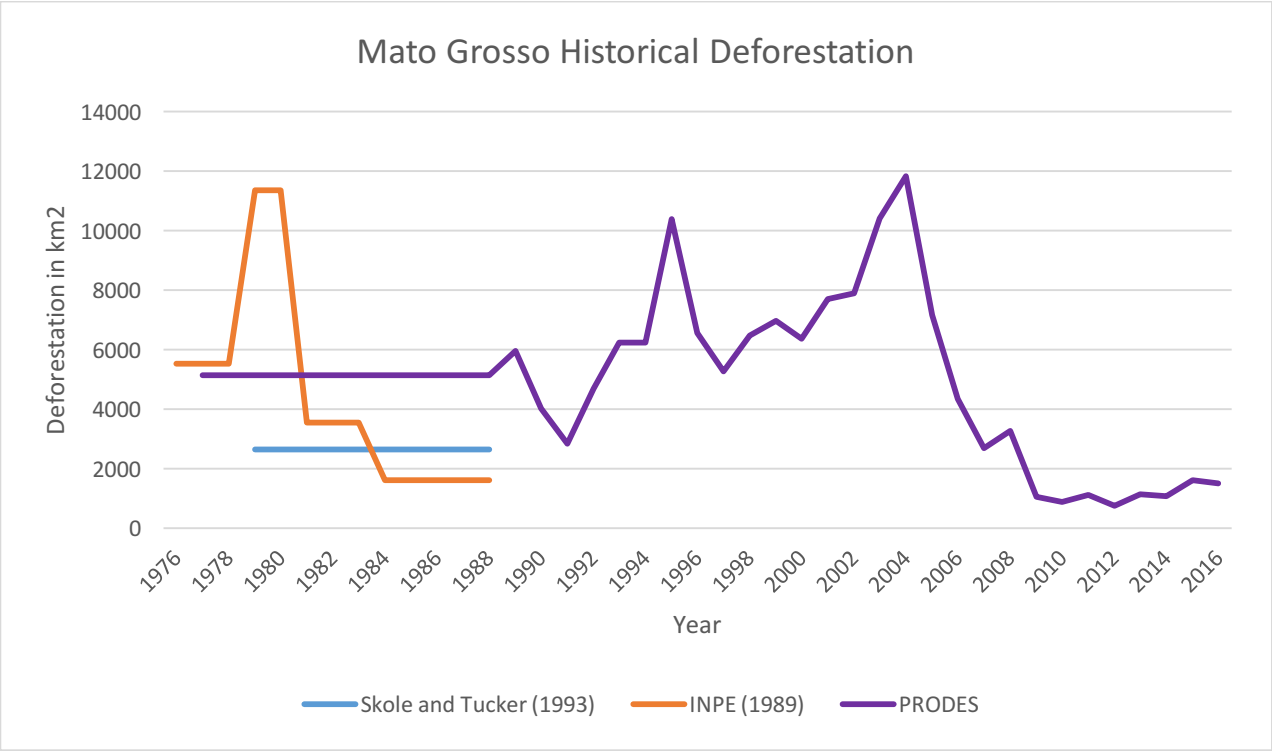


Figure 6.5: Historical Amazonian Deforestation in Mato Grosso.

In 2000, with support from PPG7 administered by the World Bank, Mato Grosso launched the System for Environmental Licensing of Rural Properties (SLAPR). SLAPR was built as a novel system for managing rural environmental licensing, monitoring, and enforcement related to the Forest Code using remote sensing and GIS technology (Rajão, Azevedo, and Stabile 2012). Registration in SLAPR occurred on a voluntary, property-by-property basis. There were numerous problems with the system, including low-resolution monitoring technology, reluctance of landowners to 'turn themselves in' and be fined for illegal clearing, but also reluctance of state authorities to fine those who registered to avoid deterring people from the system (Azevedo 2009; Rajão, Azevedo, and Stabile 2012). Rausch explains that SLAPR was intended by the state

government as a way to leverage funding for other development programs, and licensing (which would legalize further agricultural expansion) was favored over monitoring (which would detect illegal clearing) (2013, 165). SLAPR ultimately did little to constrain deforestation, though it was nonetheless strongly opposed by rural agricultural interests. To the contrary, Lima et al. (2005) found that deforestation was higher on licensed properties than on those properties without licenses, supporting the claim that SLAPR was intended more as an economic project than an environmental one, aimed at legitimizing Mato Grosso's agricultural production for external markets (Azevedo 2009). As one rancher told me in Nova Ubiratã, environmental registration was a way for the government and agro-industry associations to "put a stop to the environmentalists" (NU01 140506). Deforestation continued to increase after the introduction of SLAPR, and opposition to the system may have contributed to the election of Blairo Maggi, Brazil's largest soy producer, as governor of Mato Grosso in 2002 (Rausch 2013, 166).

Maggi's election led many environmentalists to fear the worst for forest conservation in Mato Grosso (e.g., Fearnside 2003). Deforestation in the state increased over 13 percent from 2003 to 2004, and in 2005 Greenpeace bestowed on Maggi its 'Golden Chainsaw' award for the Brazilian who had most contributed to the destruction of the Amazon. During 2005, however, deforestation in Mato Grosso began to decline precipitously, and by the time Maggi left the governor's office in 2010, he had even come to be viewed as an "unlikely hero of the environmental movement" for his efforts to combat illegal deforestation (Perlroth 2009, 38).

Of course, the reduction in deforestation in Mato Grosso is not attributable solely to Blairo Maggi. After 2004, deforestation in Mato Grosso was checked by new governance interventions and declining soy profitability due to a downturn in global commodity markets (Macedo et al. 2012). Lowered economic incentives for expansion and the potential economic benefits of certified

legal compliance during times of reduced profitability contributed to a willingness of Mato Grosso soy producers to engage in new governance initiatives in the 2005-2007 period (Rausch 2013). Blairo Maggi's company, Grupo Maggi, had already in 2002 begun to develop an 'environmental and social management system' for its supply chain under the conditions of a loan from the International Finance Corporation, to which it agreed in part with the objective of achieving "legitimacy and recognition for adhering to environmental and social standards that other soy exporters could not claim" (Stickler and Almeida 2008, 76). In 2006, in response to a Greenpeace campaign, the major transnational soy traders agreed not to purchase soy produced on newly deforested land in the Amazon, and Maggi's company was well-prepared to comply with the moratorium.

Also in 2006, TNC began to collaborate with the municipal government of Lucas do Rio Verde, a soy-producing municipality on the BR-163 to the north of Cuiabá, to support landholders to work toward compliance with the Forest Code, allowing the municipality to promote an image of 'environmentally-responsible' production (Ferreira 2010; Rausch 2013). The project received support from major national and transnational agribusiness corporations with operations in the municipality, as well as from the rural producers' syndicate, State Public Ministry, and SEMA. Spiking commodity prices in 2007 drove an increase in deforestation across the Amazon, and the federal government responded in 2008 by creating the 'priority list' of municipalities for combating deforestation and imposing credit restrictions on properties not compliant with environmental regulations (Assunção, Gandour, and Rocha 2012; Assunção et al. 2013; Arima et al. 2014). The tightening of the federal enforcement regime posed an impediment to agro-industrial expansion in Mato Grosso and threatened the reputation of the state's producers in international markets. These new pressures led to a public spat, with *The New York Times* reporting that

"Governor Maggi was exercised enough by the [INPE deforestation] report – which led to harsh measures stifling business in his state – that he asked for, and was granted, a meeting with the president, Luiz Inácio Lula da Silva," and the state government went so far as to submit a formal refutation of INPE's findings (Barrionuevo 2008).

In Lucas do Rio Verde, the fining of 15 property owners by IBAMA in September 2008 triggered intense lobbying by municipal leaders, TNC, and SEMA. This lobbying and the general dissatisfaction with the federal enforcement regime culminated in a state law that officially created CAR in Mato Grosso, modifying SLAPR by breaking environmental licensing into stages and granting producers who completed CAR a grace period to bring their properties into compliance without being fined (Rausch 2013, 263–264). CAR was promoted by the Maggi government at the state level through the creation of a 'Legal Mato Grosso' program (*Mato Grosso Legal*), and was taken up by the federal government as a condition for municipalities to exit the priority list, and eventually as a requirement for all rural properties in Brazil in the 2012 Federal Forest Code.

In addition to his support for environmental registration as a strategy for 'legalizing' agricultural production, Maggi became a strong advocate for Mato Grosso's participation in an international REDD mechanism, enrolling his state as one of the founding members of the Governors' Climate and Forests Task Force (GCF) in late 2008. Support for REDD initiatives has continued under Maggi's successors, including through the passage of a State REDD+ Law in January 2013, a part of which highlights the potential climate benefits of agro-industrial development (such as improved pasture management and cattle genetics) in supporting deforestation reductions (Lacerda 2012; Lacerda 2013).

In sum, under pressure from international and national-level actors, state-level politicians and bureaucrats in Mato Grosso joined with international and domestic NGOs, multinational and

regional agribusiness companies, and proactive municipal governments to negotiate responses to federal environmental regulations and implement a land sparing agenda centered on territorial constriction and intensive agro-industrial production. With the exception of relatively minor increments in 2008 and 2011, annual deforestation in Mato Grosso declined steadily from 2004 until it bottomed out in 2012 at 757 km^2. While deforestation has ticked upwards since 2012, it remains more than 80 percent below its 2004 peak. Especially during the period of increased agribusiness profitability after 2007, these declines are attributable to the governance structures that have emerged through the operation of land sparing coalitions across multiple levels.

TNC's activities in Mato Grosso traverse the boundary between the Cerrado and Amazon biomes, and between expanding industrial row crop cultivation and frontier logging and ranching areas. The following sections compare the municipalities of Nova Ubiratã and Cotriguaçu. I begin with Nova Ubiratã, which of the four Brazilian cases is the municipality most integrated into a productivist, agro-industrial economy. Nova Ubiratã experienced rapid growth in soy production during the 2000s, which drove large-scale deforestation as well as intensification on remaining cattle ranches. The municipality entered the Ministry of Environment's priority list in 2008. In 2010, TNC began working in Nova Ubiratã under its Amazon Fund project to support municipal compliance with environmental regulations, and staff report that the project was particularly successful. Today, Nova Ubiratã is a post-frontier agro-industrial area with little remaining forest land that could legally be open to conversion.

Cotriguaçu is a newer frontier zone where a REDD project initially planned with TNC was subsequently led by ICV, a Mato Grosso NGO, and where TNC's follow-up activities have been plagued by difficulties. In the boom and bust of frontier extraction, Cotriguaçu is a municipality on the bust, as timber extraction is on the decline and ranching is not very profitable due to isolation

and poor terrain. Governance efforts in the municipality have followed a land sparing model, through Forest Code enforcement and support for ranching intensification, but Cotriguaçu remains an area firmly in the periphery where commercial activity is primarily extractive logging and ranching, and there are few prospects for integration into more productivist economic circuits.

Nova Ubiratã: Soy and the Productivist Transformation

Nova Ubiratã, which became an independent municipality in 1995, covers 12,707 km^2 in central Mato Grosso, in the transition zone between the Cerrado and Amazon biomes in the upper reaches of the Xingu watershed. The municipal seat lies on the BR-242 highway just over 80 km to the east of Sorriso, which is a major center of soy production on the north-south BR-163 corridor. The municipal territory falls between the municipalities of the BR-163 to the west and the Xingu Indigenous Park to the east. The Rio Ronuro Ecological Station (ESEC), a state-level protected area, was created in 1998 in the eastern part of the municipality, with an area of 131,795 ha, but reduced by nearly 30,000 ha in 2005 to exclude four large landholdings in the southern part of the reserve. The far northeastern tip of the municipality overlaps 30,000 ha of the Xingu Indigenous Park. Roughly 40 percent of the municipality is classified as Cerrado, while the remaining 60 percent is in the Amazon biome.

Colonization of the area began in the 1950s, directed by private colonization companies that settled nearly 200 Japanese families with the idea of promoting production of rubber and pepper. Many of these initial settlers perished in a malaria epidemic, and those that survived migrated to more developed areas. Land speculators from the South also established holdings in Nova Ubiratã during this period, but it was not until the mid-1970s that a wave of permanent colonization began, directed by a new set of colonization companies that attracted settlers from southern Brazil, while the ‘urban center’ of the municipal seat was established only in 1986. The

colonization process followed a pattern common to Amazonian frontiers of land grabbing and violent land conflicts between large and small landholders. Land was cleared by logging operations, ranchers, and colonists who established rice and soy farms.[61] Between 1996 and 1999, the federal government also created four agrarian reform settlements covering over 77,000 ha, primarily in the southwest and northeast of the municipality, where over 900 families of small farmers have been settled. The population increased rapidly, from 3859 residents in 1996 to 5654 in 2000. By 2000, nearly 20 percent of the municipal territory had been deforested, an area of 2400 km^2.

During the early 2000s, soy cultivation expanded rapidly in Nova Ubiratã, linked with the regional soy boom along the BR-163 corridor. The municipal population continued to grow, reaching 7782 in 2007. Sorriso and Lucas do Rio Verde, lying to the west of Nova Ubiratã on the BR-163, had become major agro-industrial centers, with Sorriso becoming the largest municipal producer of soy in Mato Grosso in 1997. Smaller ranchers sold their land, pastures were converted to soy (usually rotated with corn or cotton), and forest was felled either for direct conversion to soy or for new pastures and land speculation.

Deforestation in Nova Ubiratã spiked along with soy expansion, peaking in 2004 when 383 km^2 of forest was cleared. Deforestation declined steeply after 2005, reined in by PPCDAm and a slump in commodity prices, but forest clearing jumped again in 2008 when commodity prices rebounded (Figures 6.6-7). Nova Ubiratã was included in the federal priority list in 2008, and producers in the municipality were subjected to credit restrictions and intensified enforcement. In the words of a technician with the municipal Environmental Secretariat, enforcement "comes down

[61] Information in this paragraph on the colonization of Nova Ubiratã is based primarily on Ivo Beuter's (2000) history of the municipality.

heavily, it's rigid" (NU02 140506). A former municipal official reflected, "Before, Nova Ubiratã was at the end of the world. [You could deforest and] no one would know, no one would do anything. Now the regulatory deadlines are pressing" (NU08 140513). Family agriculture was particularly affected by the enforcement actions, and the entire agrarian reform settlements of Boa Esperança, home to nearly 400 families, were embargoed by IBAMA, meaning they could not legally access credit or sell their cattle or crops. Informants also report that the municipality's status on the priority list may have deterred some agribusiness companies and businesspeople from investing in the municipality (NU07 140512; NU04 140507). These new enforcement measures caused most landowners in Nova Ubiratã to cease deforestation on their properties (NU02 140506; NU06 140512; NU09 140515).

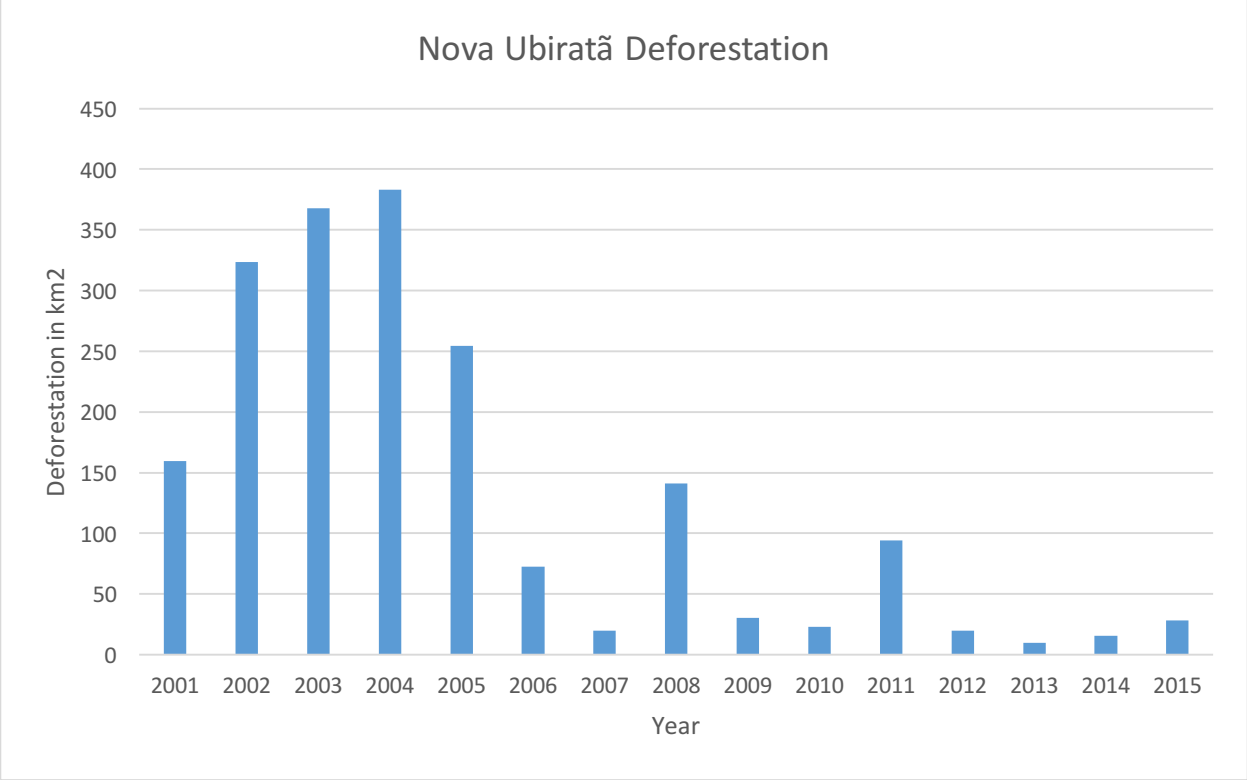


Figure 6.6: Annual deforestation in Nova Ubiratã, 2001-2015.

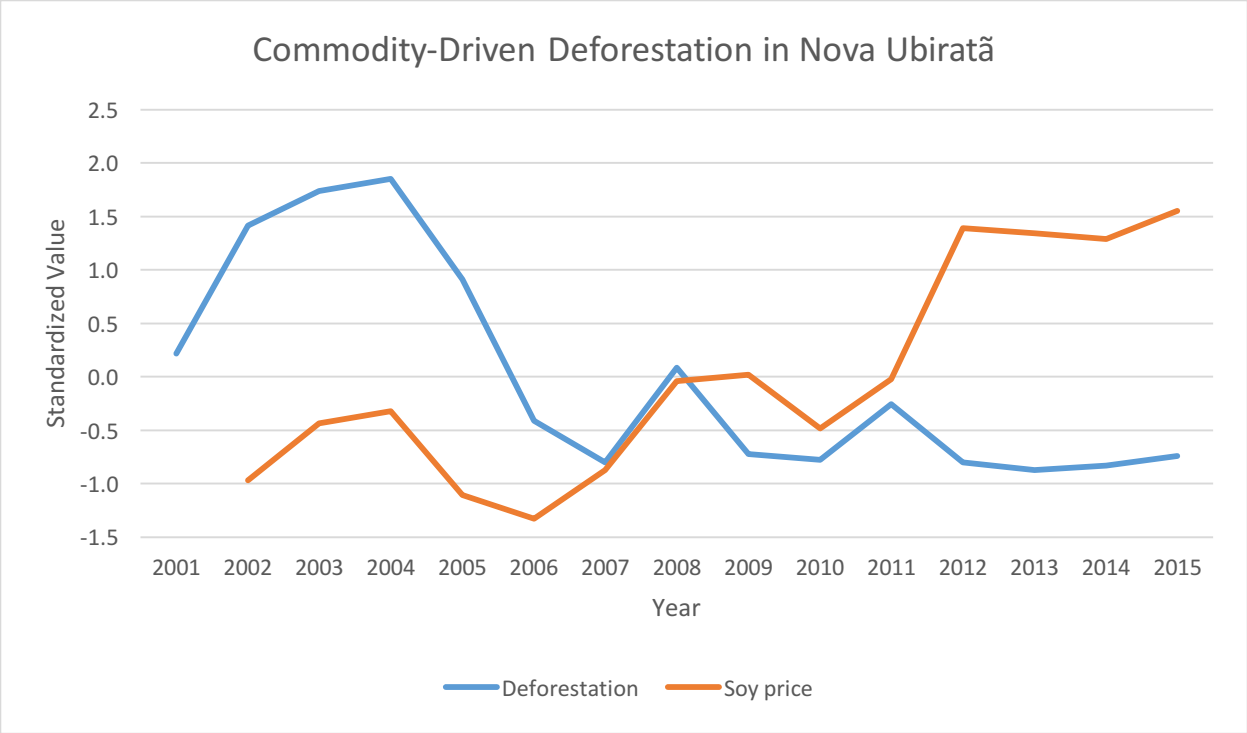


Figure 6.7: Commodity-driven deforestation in Nova Ubiratã. Deforestation and soy prices appear closely correlated until 2011, after which deforestation has remained low despite spiking commodity prices. Standardized soy prices were calculated from the BRL price per 60 kg in Paraná, provided by Cepea (2017).

In an effort to remove the municipality from the priority list and help landowners 'disembargo' their properties, the mayor of Nova Ubiratã, Osmar Rossetto (known as Chiquinho), sought out TNC. People in Nova Ubiratã knew of TNC's work in the neighboring municipality of Lucas do Rio Verde, and Chiquinho hoped to implement a similar project in Nova Ubiratã. At first TNC had no funding for a project in the municipality, but when TNC received a BRL 16 million grant from the Amazon Fund to support CAR in 12 municipalities in Mato Grosso and Pará, Nova Ubiratã was included in the program (NU09 140515). The TNC project in the municipality, called 'Greener Nova Ubiratã' (*Nova Ubiratã Mais Verde*), was implemented in partnership with the municipal government and the rural syndicate (the large landowners' association). TNC hired a municipal manager to begin a process of mapping and database development, as well as

communication and awareness-raising regarding Forest Code compliance and environmental management. Soon thereafter the project also contracted a forestry engineer who was certified to formally register properties in CAR.

The project principally supported CAR registration for small landowners and residents of agrarian reform settlements, since most large landowners were already registered or in the process of CAR registration (NU03 140506; NU06 140512). The municipal government also sought to use CAR to support broader governance goals. A former municipal official describes how data collection in support of CAR registration facilitated everything from environmental enforcement to tax collection to spatial planning to transportation for schoolchildren. He suggested that a comprehensive database of municipal properties could also be used to market the municipality and attract business. "You can't do public sector work today without planning," the official told me, and the CAR process helped build this municipal capacity (NU09 140515). More specifically, the municipal government attempted to leverage the CAR database to advance land titling in Nova Ubiratã. In 2012, Nova Ubiratã established a municipal council for tenure regularization (CONREDES) that became a pilot for regularization efforts led by the Mato Grosso Inspector General's office (*Corregedoria Geral da Justiça*) (*ExpressoMT* 2012).

Under the heavy enforcement regime of the priority list, there was little deforestation in Nova Ubiratã after 2008. Most areas in the municipality that could legally be cleared were already deforested by the time the priority list came into effect (NU09 140515). As the municipal secretary of environment explained, "What was there to be deforested was already deforested…. The timber has already been taken out. The *fazendas* are already industrialized" (NU03 140506). There are two groups responsible for what deforestation still occurs in Nova Ubiratã, according to a former contractor for the TNC project, "those with no option, who must produce to survive and have no

choice but to deforest; and those who have lots of money and can pay fines without any trouble" (NU04 140507). An official with the local property registry (*cartório*) confirms, "Remaining deforestation is either large actors who want to open more areas to produce more – they know that they can defend themselves in the courts and the profit they make will be greater than the costs of resolving the legal issues; or settlements where people deforest because they do not have conditions to develop sustainable activities" (NU07 140512).

'Those with no option' have felt the brunt of federal enforcement measures. In the embargoed agrarian reform settlements, "Family farmers had their access to official financing blocked and were unable to produce. As a consequence, they were unable to sustain themselves from their land. Many families were obliged to abandon their lots to seek employment and income in the city" (Édison 2012). In 2012, the municipality negotiated with IBAMA to disembargo lots in the settlements that completed CAR, but when a new IBAMA superintendent arrived that year he refused to disembargo any more lots due to a dispute between IBAMA and SEMA (NU09 140515). (IBAMA objected to SEMA approving CAR registrations without investigating a property's on-the-ground Forest Code compliance (NU08 140513).)

Among 'those who have lots of money,' the protagonist of continuing large-scale deforestation in Nova Ubiratã is Vademilso Badalotti. Badalotti is a large landowner who lives in Paraná, in southern Brazil. He owns 30,000 ha in Nova Ubiratã alone, and in 2011 he was responsible for six of the ten largest illegally deforested areas in Mato Grosso (Vital 2011). Badalotti illegally cleared nearly 6000 ha of forest in Nova Ubiratã using an illegal practice known as *correntão*, where two bulldozers are connected by a chain and driven forward together to fell all vegetation that comes between them. Deforestation by Badalotti, along with large-scale clearing by other landowners, brought a federal enforcement task force to the municipality in May 2011 (O

Documento 2012). Badalotti was known to be engaging in land speculation by buying and clearing areas in Nova Ubiratã, with the intention of renting out deforested areas for rice or soy production (Vital 2011; C. Carvalho 2011). "Speculators get fined, but it is still financially worth it…" a former municipal official explained, "They clear the land, and then fight in the courts. They are carpetbaggers (*aventureiros*) with guts and money…. If someone has an area that they don't want to or can't legalize, they may sell it to an *aventureiro* to clear and speculate on" (NU09 140515). "Have you heard of Badalotti?" a technician in the municipal Environmental Secretariat asked me during an interview. "Yes," I answered, "how did he deforest such a large area?" The technician rubbed his fingers together: "money and guts" (NU02 140506).

Despite the efforts of the municipal government and the Greener Nova Ubiratã project, the municipality failed to exit the priority list, principally due to difficulties in completing CAR in agrarian reform settlements, bureaucratic delays by SEMA in confirming CAR registrations, and deforestation by land speculators such as Vademilso Badalotti (TNC19 140502; TNC21 140516; TNC20 140428). Annual deforestation has been minimal since 2011, however. At the end of the TNC project in December 2013, 55 percent of the private property space in Nova Ubiratã had been registered in CAR (Fundo Amazônia 2014). The 2012 Forest Code revision made CAR a requirement for all rural properties in Brazil, but also changed the character of CAR in Mato Grosso. The Mato Grosso registry originally required documentation of land rights for completion of full environmental licensing, but the 2012 Forest Code instituted CAR as an unconfirmed declaration by property holders, which was the more flexible model that had been deployed in Pará. By 2017, an area of 1,212,389 ha in Nova Ubiratã had been registered in CAR, which is nearly 100,000 ha greater than the area legally open to registration in the municipality. These registries include over 4000 ha overlapping indigenous territories and nearly 74,000 ha

overlapping designated conservation areas (SFB/MMA 2017). The municipal population has also continued to grow, reaching an estimated 11,074 in 2016.

The perceived success of the project from the standpoint of TNC staff appears principally linked to the strong engagement of the municipal government and in particular the active involvement of the mayor, Chiquinho. One TNC staff member notes that "Chiquinho was the most involved of all the mayors. With any question he would pick up the phone and call TNC" (TNC21 140516). The local forestry engineer notes that Chiquinho "knew how the whole process worked, including the software" (NU04 140507), and another TNC employee recalls that Chiquinho would check for fire alerts every day on his cellphone to monitor new deforestation (TNC20 140427). After leaving the mayorship, Chiquinho went on to become a functionary with INCRA in Cuiabá, and during our interview in the INCRA offices he frequently turned to his computer to pull up GIS and Google Earth files to illustrate his points. Bernadete Rechmann, Chiquinho's Secretary of Environment during most of the project period, was also an active promoter of the project, particularly in the agrarian reform settlements (TNC19 140502). Figure 6.8 shows the adjacent Secretariats of Environment and Agriculture on the main street in Nova Ubiratã.

Figure 6.8: Secretariats of Environment (left) and Agriculture (right) on the main street in Nova Ubiratã, 09 May 2014. At the time, there was one person serving as joint Secretary of Agriculture and Environment.

While some members of the municipal Environmental Secretariat and the rural syndicate complain that they expected more from TNC (NU02 140506; NU06 140512), there was general agreement that the Greener Nova Ubiratã project had been worthwhile, deforestation was largely under control, and CAR registration had advanced. A former municipal government employee notes that national-level debates around the Forest Code revision had hindered the project, since industry associations had counseled landowners to wait for the new legislation before completing CAR. With the passage of the Forest Code revision and harmonization of state regulations, however, “the situation has been clarified” and even industry associations were advising farmers

and ranchers to complete CAR (NU09 140515). Nova Ubiratã's position between the Cerrado and Amazon biomes added a wrinkle to environmental compliance as well, since properties in the Cerrado biome are only required to maintain 35 percent of their area as a Legal Reserve, while properties in the Amazon generally must maintain 80 percent. While most large landholders know in which biome their property falls, there are stories of small producers who deforested beyond their legal limit because they believed themselves to be in the Cerrado when in fact they were in the Amazon (NU03 140506; NU09 140515).[62]

Environmental licensing and tenure regularization remain mired in the inefficient bureaucracies of SEMA and INCRA, but since 2012 Nova Ubiratã has become fully consolidated as a post-frontier zone of intensive ranching and industrial row crop agriculture under a productivist political-economic regime at the municipal, state, and national levels that emphasizes environmental compliance, tenure regularization, and agro-industrial development. The president of the rural syndicate, a local rancher, described to me this transformation:

> "Production has increased through the restoration or transformation of degraded pastures, primarily into [field crop] agriculture. The pasture area diminished. Ranchers became farmers and many farmers also came from outside the municipality, including from Sorriso and Lucas. Technology increased and people invested a great deal. …The character of the cattle herd changed. Cattle breeding [*recria*] diminished, but finishing [*engorda* – literally, 'fattening'] stayed at the same level. Producers are now using confinement. …Some ranchers who became farmers are doing integrated [soy/maize and cattle] production. Pastures were very degraded, so the ranchers were going to have to take up agriculture. With the end of deforestation, ranchers realized they needed to intensify. Ranchers themselves sought out new technologies…. Old, extensive ranching is very rare today. Old ranchers had to give space for technology to enter.

[62] The story of biome boundaries is a fascinating study of the relationships between ecology, science, agricultural production, and environmental governance. Landholders may petition SEMA to change the designation of their property from Amazon to Cerrado by contracting a study that conducts a full inventory of the property's vegetation (including tree species, trunk sizes, and so forth). While the official biome line is not altered, SEMA may agree to catalog a property as Cerrado for purposes of licensing (NU04 140507). If the property is reclassified, the landholder gains a great deal of productive area. Of course, this process is complicated and costly enough only to be accessible to more capitalized famers and ranchers.

> "The expansion of production into degraded areas is going to cease eventually [for lack of additional degraded areas], and further expansion will have to be from the opening of currently embargoed areas. After that, production will stagnate. Production costs have increased greatly. Oil and diesel are very expensive and producers can't clear new areas. Throughout Mato Grosso, production will stagnate unless there are increases in technology. Since there is great demand, there will be new technologies. It's the natural process of production. Instead of opening new areas, producers will have to produce ever more within the same area. They will increase production and diminish costs with technology." (NU01 140506)

This rancher's narrative provides a remarkably complete recapitulation of the land sparing logic of intensification as a response to the 'end of deforestation,' the Boserupian logic of intensification as the result of land scarcity, and modernization discourse that views agricultural development as a process of productivist investment and technological intensification. His description of the land use transformation in Nova Ubiratã is borne out by statistics showing the expansion of soy production over an ever greater proportion of the deforested area of the municipality (Figure 6.9), which implies that the continuing increase in the municipal cattle herd concurrent with declining deforestation and increasing soy area has come from the intensification of ranching operations (Figure 6.10). Figure 6.11 shows an agricultural landscape typical of Nova Ubiratã today. The land use transition in the municipality mirrors the state-level transition in Mato Grosso that has been heralded as the 'decoupling' of deforestation and soy production (Macedo et al. 2012). A member of the municipal government confirmed that ranching operations were now working with confinement and devoted to finishing cattle, while breeding operations had moved northward towards the border with Pará (NU05 140509).

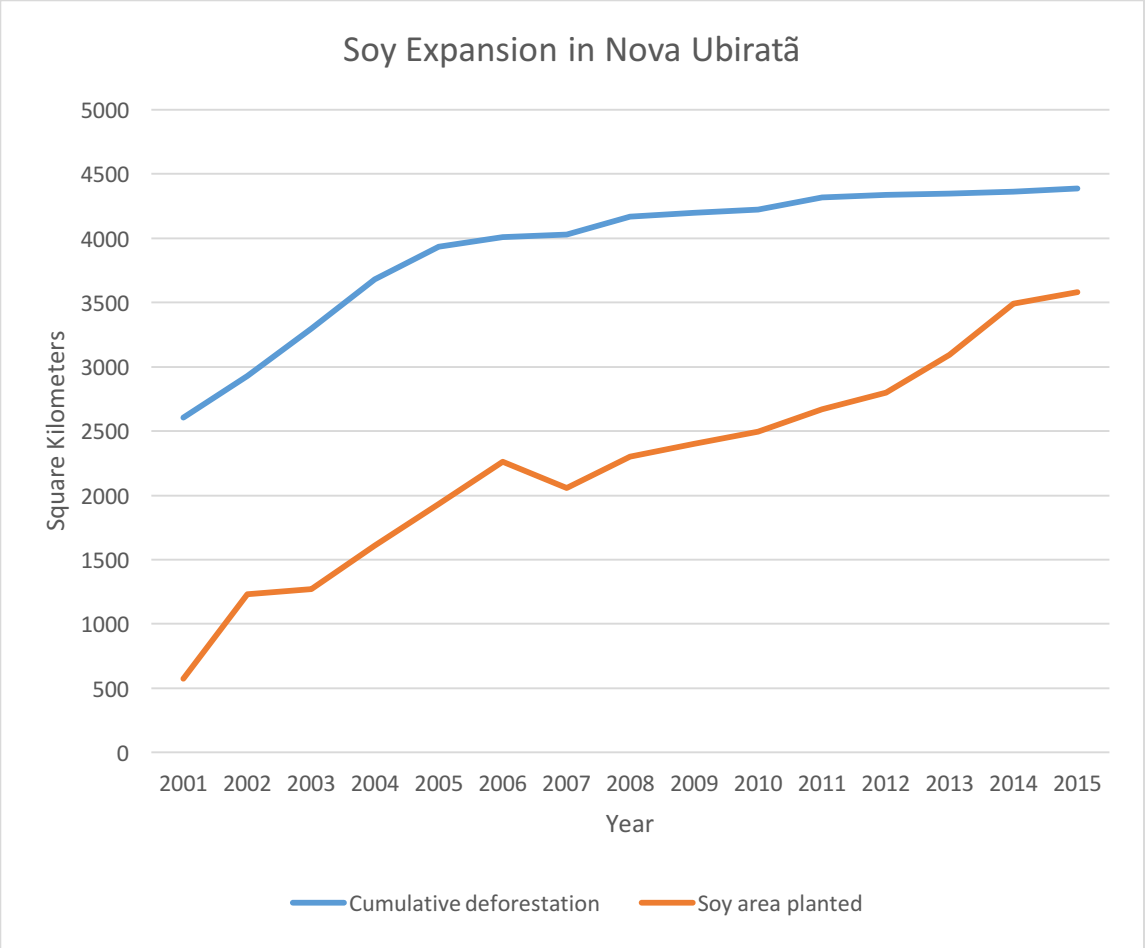


Figure 6.9: Soy expansion in Nova Ubiratã. Soy and associated row crop cultivation has occupied an increasing proportion of the total deforested area of the municipality (IBGE 2016d).

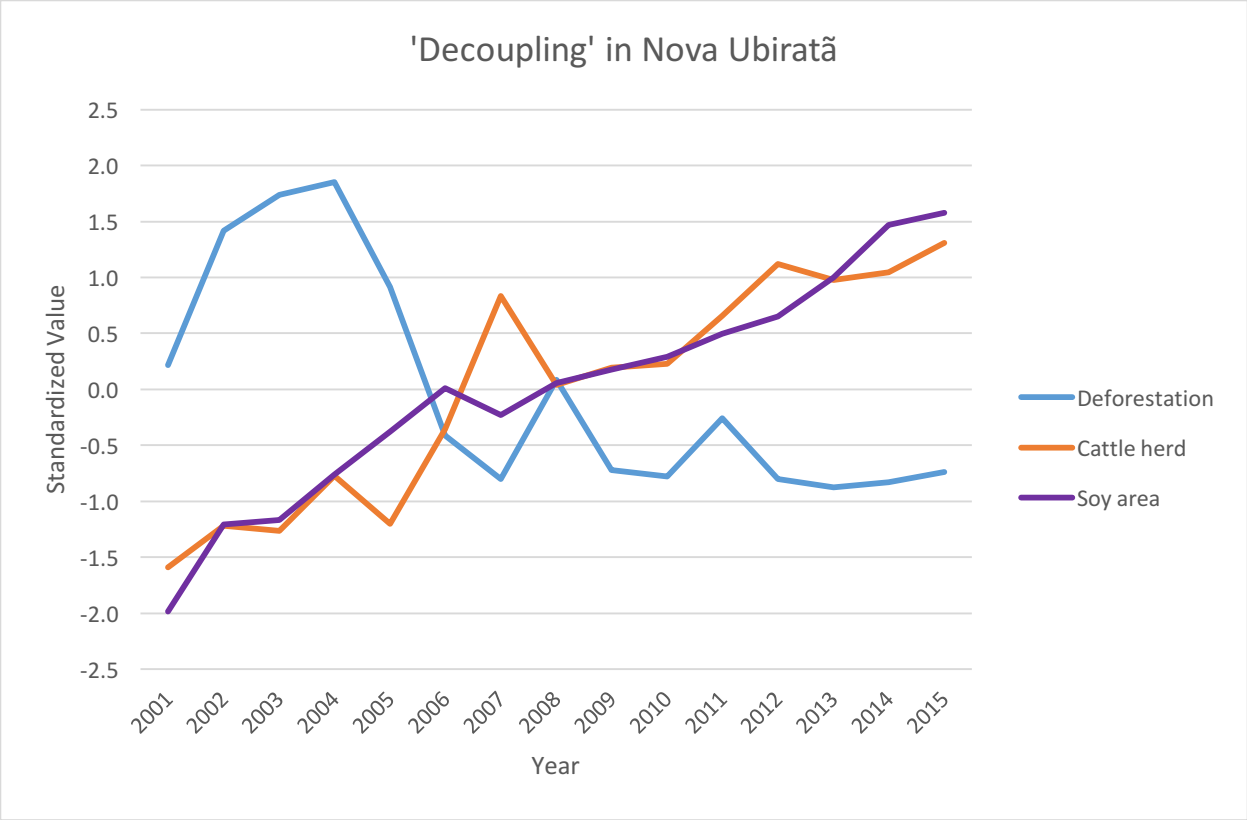


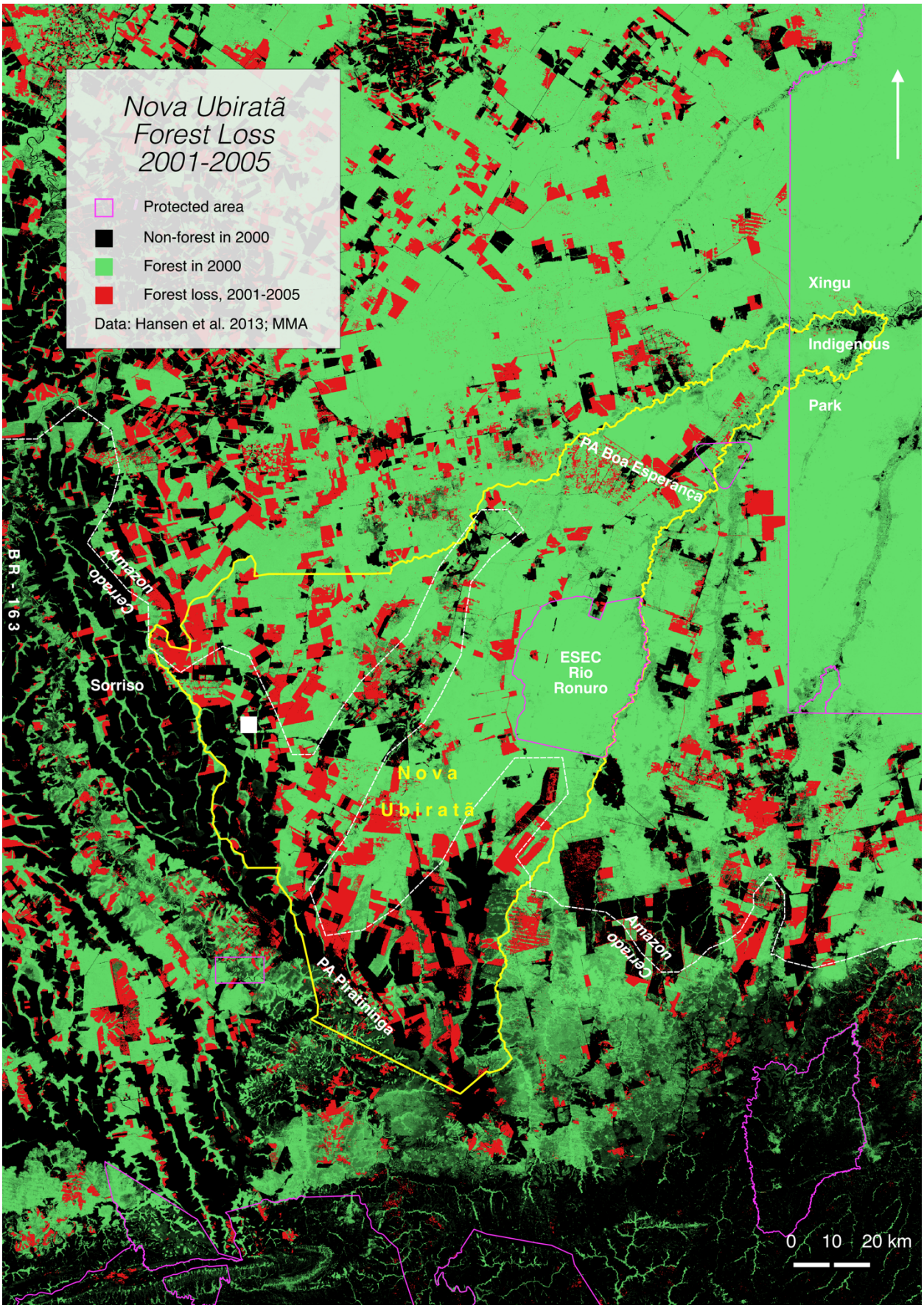
Figure 6.10: The 'decoupling' of agricultural production and deforestation in Nova Ubiratã. While deforestation has declined, the cattle herd and soy area have continued to increase (IBGE 2016d; IBGE 2016c). All values standardized for comparison.

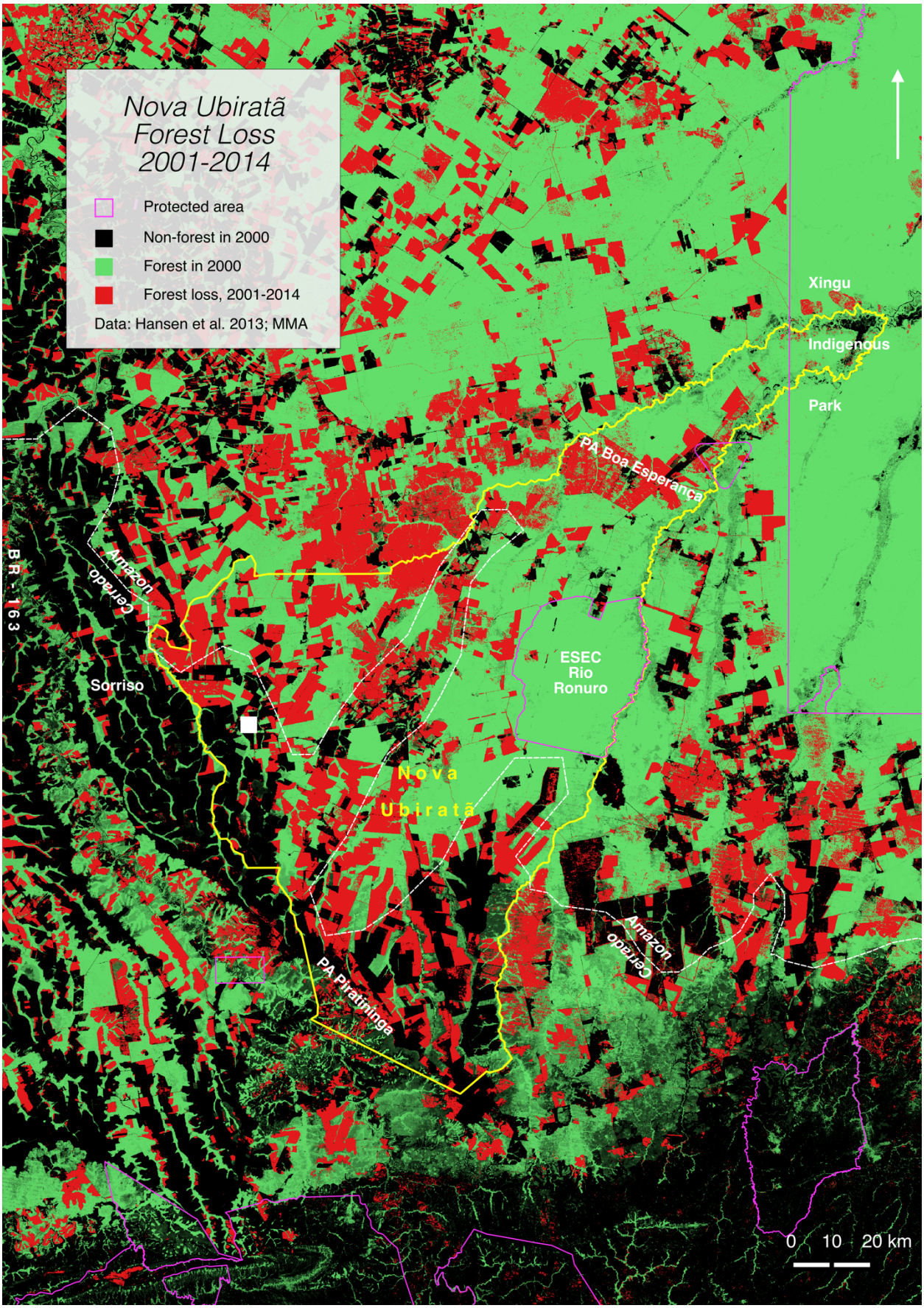
Figure 6.11: Industrial farming operation on the BR-242 between Sorriso and Nova Ubiratã. A field of maize stretches to the horizon, where remnants of forest vegetation are visible as thin dark lines, 05 May 2014.

Affirming the prominence of a productivist, land sparing vision in the municipality, a former president of the rural syndicate avers, "Production does not depend on deforestation: we don't have to cut down a single tree. There is degraded pasture available, and technology. Ranching is no longer extensive. It needs to be intensive, with pasture rotations and management. Degraded pasture can be used for agriculture. New techniques are changing the profile of agriculture and ranching, …and there are various credit lines… and agencies that help support intensification" (NU06 140512). With territorial constriction through environmental enforcement and an inflow of investment linked to the expansion of the soy frontier, Nova Ubiratã has transformed from a zone

of extraction to a zone of production, moving from the periphery of logging and extensive ranching toward the expanding agro-industrial core. Behind the modernist triumph of the soy farmers and intensive ranchers, however, lies the displacement of smallholders, squeezed by environmental regulations imposed without corresponding support for compliance and agricultural investment. This unevenness of the Amazonian transition is highlighted in the following case studies, where the productivist transition has been less complete.

Figures 6.12-13: 6.12) Map of Nova Ubiratã showing forest loss in 2001-2005, during the peak of deforestation in the Brazilian Amazon; 6.13) Map of Nova Ubiratã showing forest loss in 2001-2014. Protected areas are shown with 2017 boundaries. PA (*projeto de assentamento*) denotes an agrarian reform settlement. The municipal seat is denoted by a white square. The biome division between Cerrado and Amazon is marked.


Nova Ubiratã
Forest Loss
2001-2005
Protected area
Non-forest in 2000
Forest in 2000
Forest loss, 2001-2005
Data: Hansen et al. 2013; MMA
Xingu
Indigenous
Park
PA Boa Esperança
ESEC
Rio
Ronuro
Nova
Ubiratã
PA Piratininga
Amazon
Cerrado
Sorriso
BR - 163
0 10 20 km


Nova Ubiratã
Forest Loss
2001-2014
Protected area
Non-forest in 2000
Forest in 2000
Forest loss, 2001-2014
Data: Hansen et al. 2013; MMA
Xingu
Indigenous
Park
PA Boa Esperança
ESEC
Rio
Ronuro
Nova
Ubiratã
PA Piratininga
Amazon
Cerrado
Sorriso
BR - 163
0 10 20 km

Cotriguaçu: Extractive Stagnation

The municipality of Cotriguaçu in northwest Mato Grosso presents perhaps the starkest contrast to Nova Ubiratã among the four Amazonian municipal cases in terms of socio-economic conditions. Cotriguaçu is a municipality stagnating under an extractive regime, with little near-term prospect for productivist modernization, despite the efforts of an active land sparing coalition. The municipality covers 9421 km^2 on the west bank of the Juruena River in the upper Tapajós watershed, on the border between Mato Grosso and Amazonas State (Figures 6.14-15). The Escondido Indigenous Territory of the Rikbaktsa people, created in the mid-1990s, covers 1688 km^2 in the center of the municipal territory. The municipal seat lies 300 km west of the regional center of Alta Floresta and 445 km west of Guarantã do Norte and the BR-163. To the west of Cotriguaçu lies the frontier town of Colniza, known as a violent center of illegal logging ("it's easy to die there," a TNC staffer told me (TNC20 140428)), and 400 km of forest lands, parks, and indigenous territories before the road reaches the colonization areas of Machadinho d'Oeste in Rondônia. To the north lie the forests and protected areas of southeastern Amazonas, and to the south of Cotriguaçu, 80 km of dirt road of the MT-170 lead to the neighboring municipality of Juruena, and another 80 km lead at last to the growing agricultural centers of Castanheira and Juína. During the rainy season, roads often become impassable and bridges wash out, leaving parts of the municipality isolated, occasionally for days at a time.

Figure 6.14: Ferry to cross the Juruena River between Cotriguaçu and Nova Bandeirantes on the MT-208, 16 June 2014.

Figure 6.15: Bus on the MT-170 between Cotriguaçu and Juruena, passing through the Rohsamar forest management area, 30 April 2014.

Cotriguaçu was colonized in the mid-1980s through a project of the Cooperativa Central Regional Iguaçu Ltda., a company based in Paraná in southern Brazil. The first colonists arrived from the South in 1984, and while some initially attempted to engage in rubber production, settlers quickly shifted to clearing land for small-scale agriculture. In 1991, Cotriguaçu became an independent municipality, and over the course of the 1990s INCRA established three agrarian reform settlements on the municipal territory. The first INCRA settlement was established in 1992, the second and largest, called Nova Cotriguaçu, was established in 1995 on 100,000 ha in the northwest of the municipality, and the third, called Juruena, was established in the southeast in 1997. In total, agrarian reform settlements cover 141,419 ha (15 percent of the municipality) and

are home to over 1800 families, many of whom came from land reform encampments in Mato Grosso do Sul and Rondônia (Prefeitura Municipal de Cotriguaçu, n.d.).

Logging was the main source of employment in the 1990s. Many colonists who came to the settlements ended up working for the logging companies. Some ranchers also began to arrive and establish large or medium-sized fazendas, and ranching began to grow in the settlements as well. As a director of the local agricultural cooperative (Coopercotri) recalled, "the majority of people came for [field] agriculture but couldn't make it work, and so they ended up with pasture" (COTRI05 140620). Conservation programs also began to arrive in the municipality during this period. In 1999, ONF International, the international branch of the French National Forests Office, purchased the 10,000 ha Fazenda São Nicolau in Cotriguaçu in order to reforest 2000 ha under a carbon sequestration project financed by Peugeot, the French car manufacturer (which at the time was opening an automobile factory in Rio de Janeiro). ONF has developed the fazenda into a center for research and training on reforestation and sustainable forestry and has played a role in the environmentalist coalition that developed in Cotriguaçu after 2009. Beginning in 2001, UNDP also implemented a decade-long 'biodiversity conservation and sustainable use' project in northwestern Mato Grosso, which supported initiatives including the establishment of protected areas, harvesting of non-timber forest products such as brazil nuts, and the adoption of agroforestry systems by smallholders. Informants report that the project was "very top-down," however, and it appears to have left few impacts on the ground in Cotriguaçu, though it has had more enduring effects in other municipalities in the region (D. Lima, Vivan, and Tito 2012; Nunes, Vivan, and May 2014; ICV02 140613).

Deforestation accelerated in Cotriguaçu during the early 2000s, as ranching expanded and smallholders cleared plots in the agrarian reform settlements, hoping to access federal financing

from PRONAF (the Program for the Strengthening of Family Agriculture, which was established in 1996). While some were successful in securing PRONAF funding, principally to support cattle ranching, many were not, and their deforested lots were often left unproductive for lack of credit (COTRI05 140620; author field notes 140625). In 2002, the Igarapés do Juruena State Park was created in the northern tier of the municipality, along the border with Amazonas. Most of the state park area in Cotriguaçu was incorporated into Juruena National Park in 2006, which was created as part of the expansion of protected areas under PPCDAm and supported by ARPA, the Amazon Protected Areas Program funded by international donors, WWF, and the Amazon Fund. The state and federal parks cover 1340 km^2 over the entire northern portion of Cotriguaçu, effectively closing the northern frontier.

The turning point for deforestation in the municipality came in 2005 (Figure 6.16), when the federal government's Curupira Operation busted a massive illegal logging network in Mato Grosso. The operation resulted in the arrest of the state IBAMA superintendent and the dissolution of FEMA, and brought logging activity in northwestern Mato Grosso to a temporary halt (Angelo 2005; COTRI06 140623). In 2007, IBAMA embargoed the Nova Cotriguaçu settlement for illegal deforestation, and in 2008 Cotriguaçu entered the Ministry of Environment's priority list. "The priority list was fire and brimstone," the director of Coopercotri recounts, "Fines were handed out, and many people couldn't hang on and had to give up their land to clear their names…. It was very difficult here. The government tried to soften things by saying that they would bring projects and the municipality would have priority, but it's been five years already" (COTRI05 140620). The agrarian reform settlements have suffered most from enforcement actions, as settlers have been unable to access credit since 2008, a member of the municipal Secretariat of Economic Development, Agriculture, Environment, and Land Tenure (hereafter Environmental Secretariat)

affirmed (COTRI01 140616). Deforestation diminished as illegal logging operations were shuttered and landowners sought to avoid fines and maintain their access to credit. "You cut down a tree, and here comes the helicopter!" one logger exclaimed, describing IBAMA's intensive enforcement in the municipality (author field notes, 140625).[63] In the sense that the priority list was expected to give the municipality priority for projects supporting alternatives to deforestation, however, it was felt to have had no effect (COTRI03 140616). In the view of a TNC staff member, "There's not much difference between [the neighboring municipality of] Juruena, which is not on the priority list, and Cotriguaçu, which is. IBAMA enforces in both municipalities; if you have CAR you can get financing, and if you don't have CAR you can't" (TNC20 140429).

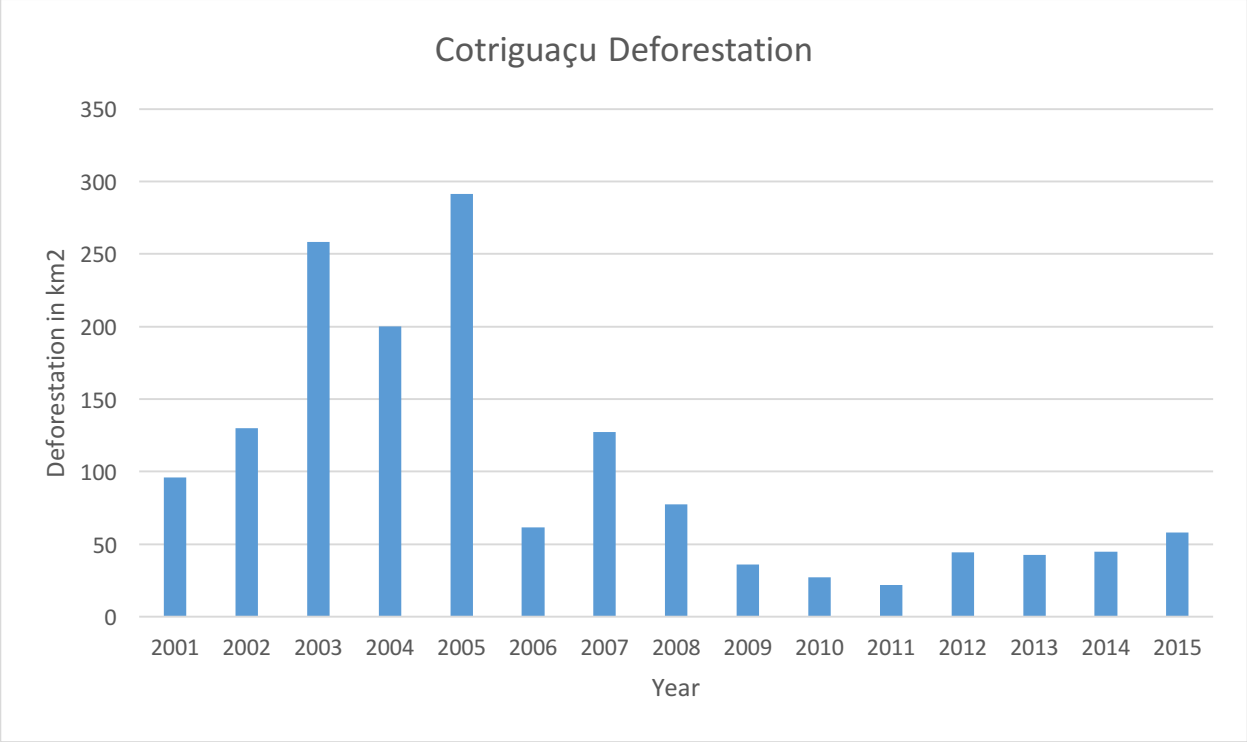


Figure 6.16: Annual deforestation in Cotriguaçu, 2001-2015.

[63] IBAMA uses helicopters to conduct enforcement activities in remote areas.

At the same time as the priority list was created in 2008, The Nature Conservancy was working in a partnership with ICV and SEMA to develop a REDD project in northwestern Mato Grosso. A project covering the whole northwestern region of the state, as the partners had originally imagined, proved unfeasible due to problems of logistics, security, and capacity (TNC06 140410). The partners were narrowing their focus to Cotriguaçu and Juruena, where they could still work across a full landscape mosaic of indigenous territories, conservation areas, agrarian reform settlements, and large properties (TNC06 140122; TNC06 140410). Around this time, the mayor of Cotriguaçu approached ICV seeking a project to help the municipality find a path to socio-economic development adapted to the new environmental governance regime. In 2009, ICV secured funding from the Packard Foundation that supported the design of a municipal-level REDD project in Cotriguaçu. At this point, TNC's Amazon Program decided to concentrate its focus on its nascent REDD pilot project in São Félix do Xingu, and the REDD initiative in Cotriguaçu was carried forward by ICV. ICV secured three years of funding from Fundo Vale, the foundation of Brazil's Vale mining company, to launch the project 'Cotriguaçu Forever Green' (*Cotriguaçu Sempre Verde* – CSV) in 2011. As TNC had received a grant from the Amazon Fund to support CAR registration in Mato Grosso and Pará, Cotriguaçu was included in TNC's Amazon Fund Project (along with Juruena), and ICV took responsibility for a suite of other initiatives under CSV (TNC06 140122; TNC12 140409). CSV was run from ICV's regional office in Alta Floresta (where I also conducted interviews with ICV staff), and during the first two years of the program staff would spend half the month in Alta Floresta and half the month in Cotriguaçu. In 2013, several ICV staff members moved full-time to Cotriguaçu.

The robust forest carbon markets that some environmentalists had hoped for after 2007 failed to materialize, and ICV implemented *Cotriguaçu Sempre Verde* as a broad 'green

development' program across multiple sectors. CSV comprised five principal components: municipal environmental management, sustainable forestry, integration of the Rikbaktsa indigenous group into municipal green development, ranching intensification, and natural resource governance in agrarian reform settlements (ICV 2008; ICV02 140613). Municipal environmental management included reactivation of the Municipal Environment Council, a multi-stakeholder forum for addressing environmental issues founded in 2010 but then defunct until 2012; strengthening of the Environmental Secretariat; and CAR registration, which was to be led by TNC. The sustainable forestry component of the project, led by ONF, sought to accelerate the approval of forest management plans in exchange for the adoption of more sustainable practices by logging companies, but ONF and ICV were unable to make headway with SEMA's bureaucracy for logging licenses and the component did not advance well (ONF04 140619; ICV02 140613). The indigenous peoples component built a relationship with the Rikbaktsa, placing an indigenous representative on the Municipal Environmental Council and supporting the management plan for the Escondido Indigenous Territory.

In addition to support for CAR, ranching intensification and projects in the agrarian reform settlements are the two components of the project that most directly target the nexus of agricultural expansion and deforestation, constituting foci for the assembling of a land sparing coalition in Cotriguaçu. CSV's ranching intensification program draws on ICV's experience with intensive ranching in Alta Floresta, and seeks to improve ranching productivity through the application of 'best practices' developed by Embrapa. The project worked initially with four ranchers, who made investments in pasture management, including liming, fencing, and forage (Equipe Projeto Cotriguaçu Sempre Verde and Ferreira Neto 2014, 19). According to one of the ranchers participating in the project, the rancher who had made the greatest investments was already in 2014

realizing a return, while the other three ranchers did not have resources to invest in as many improvements at once (COTRI06 140623). Where the average stocking rate in the municipality is around 0.7 head per hectare, the most intensified rancher, who received Embrapa's first best practice certification in Mato Grosso, achieved stocking rates of 3.5 head per hectare or more (Equipe Projeto Cotriguaçu Sempre Verde and Ferreira Neto 2014, 30). This success led to great interest among other ranchers in Cotriguaçu, with over 40 expressing a desire to join the project. The president of the ranchers' syndicate believes that the municipal herd could more than triple without deforestation (Equipe Projeto Cotriguaçu Sempre Verde and Ferreira Neto 2014, 30; COTRI06 140623). In 2015, the municipal government began implementation of an Amazon Fund project to support six pasture management 'demonstration sites,' as well as the construction of an independent Environmental Secretariat (no longer attached to Economic Development, Agriculture, and Land Tenure) and restoration of degraded permanent protection areas (Fundo Amazônia 2017).

CSV's work in the agrarian reform settlements has involved a diverse array of activities including supporting community associations, promoting agroforestry, implementing a dairying project with 15 families (which includes improved pasture management), and installing a processing operation for babaçu palm. Babaçu invades pastures and had often been regarded by the local population as a pest, but the plant has multiple uses including as an input for animal feed, a source of vegetable oil, and a feedstock for charcoal. The intent of these activities is to improve livelihoods through alternatives to deforestation, maintaining a land sparing logic at the level of smallholdings. One informant in the agrarian reform settlement notes that ICV's dairying project would only work with people who would not deforest or use pesticides or herbicides, and these requirements made it difficult for them to attract participants. ICV also required full maps of

participants' properties, and many settlers were reluctant to participate for fear that this information would be shared with enforcement agencies (COTRI02 140618).

Indeed, property registration through CAR, the component of CSV led by TNC, advanced slowly in Cotriguaçu, and it was in this municipality that TNC's Mato Grosso office experienced its greatest difficulties. TNC's municipal CAR projects under its Amazon Fund grant generally proceeded by first placing a municipal manager in each municipality, attached to either the rural producers' syndicate or the mayor's office. The municipal manager's job was to build a municipal basemap and develop awareness and capacity for completing CAR. Subsequently, the project would contract a certified technician to register CAR dossiers with SEMA. The project would also help train municipal government employees to complete CAR independently. In Cotriguaçu, the first municipal manager hired by TNC left early in the project. The second municipal manager stayed for a longer period, but left 6 or 7 months before the end of the project, at which point TNC's municipal manager from Juruena assumed responsibility for Cotriguaçu, though he was rarely present in the municipality. In addition to turnover of TNC personnel, Cotriguaçu had a succession of three different Secretaries of Environment in 2011-2013. Nonetheless, in 2011 the municipality contracted a forestry engineer to work on CAR, and in 2012 TNC contracted another technician for the municipality. Seeing the fits and starts of TNC's program, ICV also began to collaborate on CAR registration, providing a contracted technician and training for the Secretariat as well as support from technicians in Alta Floresta (ICV03 140613; COTRI07 140624). TNC, ICV, and the Environment Secretariat supported CAR registration primarily for smallholders (those with properties under 400 ha),[64] while most large landholders completed CAR with private

[64] While 400 ha is a large amount of land relative to most definitions of 'smallholder,' with 80 percent of the property in legal reserve, the owner of a 400 ha property could legally produce on no more than 80 ha, which is a modest area for extensive ranching. Most smallholders in Cotriguaçu have far less than 400 ha. Lots in agrarian reform settlements are roughly 50-60 ha, meaning a settler could legally clear only 10-12 ha, though settlers say they

contractors. When TNC's Amazon Fund project ended in 2013, just 27 percent of the private property area in Cotriguaçu had been registered in CAR, the lowest percentage of the 12 municipalities in the project. The CAR process in Mato Grosso was altered after the revision of the Federal Forest Code, and today CAR registrations in Cotriguaçu cover an area equal to over 90 percent of the total private property space, albeit with over 50,000 ha of overlap with indigenous territory (SFB/MMA 2017).

Municipal land use and economic activity in Cotriguaçu in 2014 were characterized by a dynamic of extractive stagnation. Logging continues to comprise a substantial proportion of municipal economic activity and is a major source of employment (Figures 6.17-18). In 2010, there were 20 logging companies operating in the municipality and 36 forest management areas covering 41,000 ha. Logging in Cotriguaçu is a quintessentially extractive activity: exploitation of forest management areas is generally done rapidly, 65 percent of the timber is sent to the Southeast, and virtually all the owners of the logging companies are originally from the South of Brazil (IFT 2010). Illegal logging continues to occur, though at a much lower rate than in the past (Silgueiro et al. 2015). The logging sector is generally viewed as stagnant or in decline, and most loggers are investing in ranching (IFT 2010; COTRI01 140616).

were initially instructed by INCRA to clear at least 50 percent of their lot (COTRI05 140620). Consistent with the regional state of land concentration in large holdings in the Amazon, properties larger than 2500 ha make up just 1 percent of the total number of agricultural properties in Cotriguaçu, but account for 47 percent of the total agricultural area, while 82 percent of properties are smaller than 100 ha (IBGE 2006).

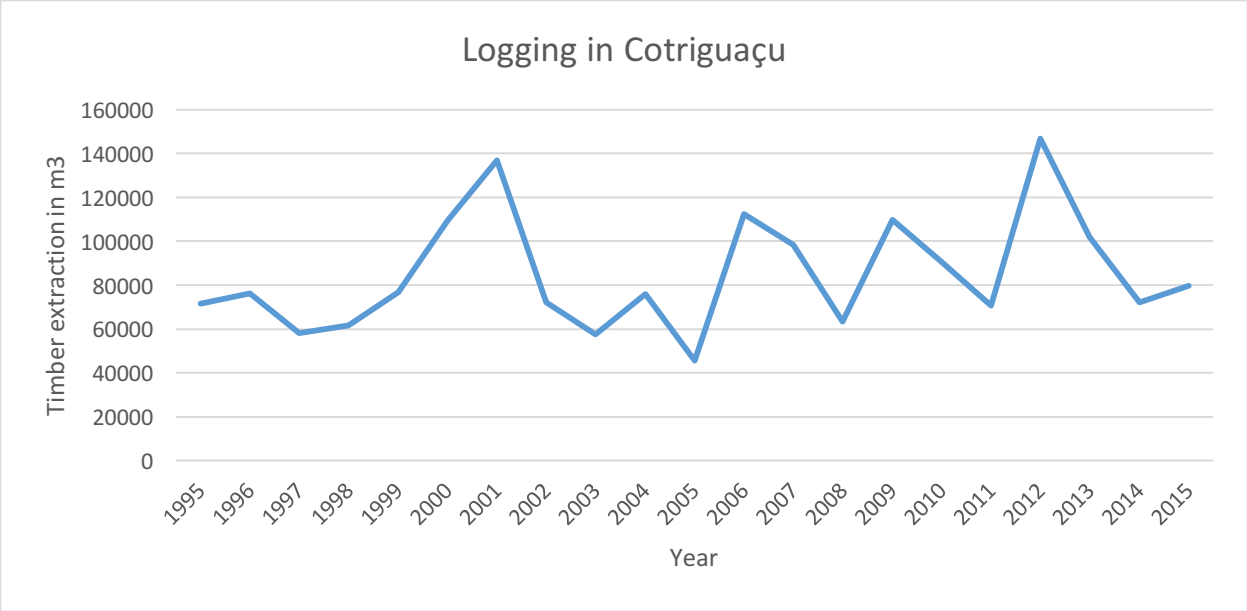


Figure 6.17: Timber extraction in Cotriguaçu, 1995-2015 (IBGE 2017a). The 2005 dip coincides with the Curupira Operation.

Figure 6.18: Logging lot in western Cotriguaçu, 18 June 2014.

Ranching occurs on 76 percent of all properties in Cotriguaçu, generally in a very extensive mode with stocking rates of roughly 0.7 head per hectare (Figure 6.19) (Equipe Projeto Cotriguaçu Sempre Verde and Ferreira Neto 2014; COTRI06 140623). Ranching has also become common among smallholders. One settler explains that people prefer cattle to agroforestry because cattle are less work: "you just put them there and you leave them" (COTRI02 140618), though the rise of ranching in the settlements is also directly related to the availability of credit, the emplacement of the cattle commodity chain versus the difficulty of commercializing agroforestry production, and the cultural power of ranchers (cf. Poccard-Chapuis et al. 2001; Smeraldi and May 2008; Hoelle 2015). Another smallholder reported that it was possible for people in the agrarian reform settlements to get credit without full environmental compliance, but only for raising cattle (author field notes 140625). "Only those working with cattle are making a profit," a municipal official told me (COTRI01 140616), and due to heavy enforcement and the examples of 'best practices' through CSV, some ranchers are now intensifying their operations. "Large producers have a different way [from smallholders] of relating to legal questions," a member of the Environmental Secretariat observed, "they have CAR and LAU [an environmental license] and forest management plans," and they are able to respond to enforcement pressures and invest in their properties (COTRI01 140616).

Figure 6.19: Dead trunk of a brazil nut tree standing in open pasture. Babaçu palms are visible at the back of the pasture on the left, 26 June 2014.

Nonetheless, beef prices in Cotriguaçu are very low due to the municipality's remoteness and high transport costs. JBS, the largest Brazilian slaughterhouse company, had built a processing plant in Juruena on the road to Cotriguaçu, with millions of reais in financing from BNDES, but the plant was closed within months of opening. JBS claimed that it was more viable to ship cattle out to the slaughterhouse in Juína. On the the unpaved MT-170, mud in the rainy season and dust in the dry season make it difficult to transport processed meat. Informants note than since JBS operates the slaughterhouse in Juína also, they effectively have a monopoly, and the additional transport costs are borne by the producer (COTRI01 140616). A TNC employee notes that it is not

uncommon to see people walking herds out along the road to Castanheira, where the asphalt starts, and loading the cattle on trucks there in order to reduce transport costs (TNC20 140428).

Small farmers suffer especially from environmental enforcement actions and lack of clear tenure and credit. Farmers in the agrarian reform settlements lack documentation from INCRA, and without documentation they were unable to complete CAR or access financing (COTRI06 140623). One smallholder living in a settlement spoke during a meeting of the Municipal Environment Council:

> "I need CAR in order to get authorizations for an irrigation system for my palmito [heart of palm production], but I can't get CAR because INCRA won't give the documents, so in the dry season my palmito is going to dry out. When IBAMA tried to fine me, I can go to the Public Ministry, because I know I have complied with the laws, but what about other people? They get fines of 300,000 reais, which is more than their lot is even worth, and the fine goes on their CPF [national identity number]. All these people have is their good name [which the fine besmirches]. Today, my property is the only environmentally regular one in the settlement, but what good does it do me? None! I'm treated no differently than my neighbor who deforested his entire lot." (author field notes 140625)

While CAR registration has advanced since 2014, TNC staff note that achieving environmental compliance on small properties in Cotriguaçu is especially difficult because the complicated hydrography of the municipality means properties have many watercourses that require permanent protection areas under the Forest Code, limiting the legally-available agricultural area (TNC20 140428; TNC19 140502). Heavy enforcement and embargoes and a lack of credit pose further obstacles for small farmers in an already remote region. "I have survived because I'm stubborn, and I love the land and I like to be independent," one smallholder told me, "but there have been many times when I despaired, and many others have left" (author field notes 140618).[65] Several

[65] This same smallholder reported having had malaria fifteen times, leishmaniasis five or six times, and six venomous snake bites. Given that the informant was one of the pioneers of the settlement and has lived for over 20 years in a remote part of the Amazon, these numbers are credible.

informants described an incipient rural exodus of the least capitalized smallholders and rising land concentration in the settlements (COTRI05 140620; ICV04 140619; author field notes 140618). Smallholders rent out their pasture to others, and though it is illegal, some people are said to now own five or six lots within the settlements, comprising emerging 'mini-fazendas' (COTRI06 140623; ICV04 140619).

Annual deforestation in Cotriguaçu averaged 47.6 km^2 in 2012-2015, over 80 percent below the 2005 peak, but still an elevated level for a small municipality, and higher than the 40 km^2 maximum required to exit the priority list. Much of this deforestation occurs in the agrarian reform settlements. Deforestation has "'diminished' in quotation marks," a former municipal official explained, "people in the settlements know they won't be held responsible because they have no documentation, so they clear and burn" (COTRI06 140623). "IBAMA fines a smallholder, he doesn't pay, it winds up in the courts, and things stay the way they are. The smallholder doesn't have documentation to access credit anyway," an ONF employee affirmed (ONF04 140609). "People are going to burn and they know they will be fined; they will contest the fine and put cattle on the land. There is no other competitive option for them," a member of the Environmental Secretariat echoed.

In sum, Cotriguaçu is a case where a strong land sparing coalition has emerged that includes federal enforcement agencies, TNC, ICV, ONF, funding bodies such as Fundo Vale and the Amazon Fund, the municipal government and the ranchers' syndicate. The idea of REDD as a source of financing has not advanced, but territorial constriction through the creation of parks and the indigenous territory and the robust enforcement of environmental regulations have substantially reduced deforestation. Intensification is supported by ICV and increasingly by ranchers, who have been impressed by the results of ICV's demonstration project. "We may have

raised the spirits of the ranchers," one ICV staffer said with irony, "They were unhappy with ranching in the region, but then they saw that it could be profitable" (ICV02 140613). ICV is wary of a potential rebound effect from increasing ranching productivity, and has conditioned its ranching intensification work on zero-deforestation commitments from ranchers and the syndicate (ICV01 140613). ICV was also exploring a quality seal for zero-deforestation beef, similar to the one that has now been deployed by Walmart in São Félix do Xingu.

TNC's difficulties in Cotriguaçu were in part a function of personnel problems, but these problems were also indicative of the deeper reasons why land sparing policies have failed to produce a productivist transformation in the municipality. Cotriguaçu is remote. This remoteness created a distance between TNC managers and field staff and made it more difficult to find staff willing to work in the municipality. Cotriguaçu is the "end of the line," "no one wants to stay there long," and the poor internet access made it difficult to work with TNC's GIS programs (TNC20 140417; TNC20 140428). Cotriguaçu "is a difficult place to live, because of the logistics, the economy, and so forth," an ICV employee confessed, "Many people are tired out and will speak badly of it" (ICV02 140613). The remoteness of the municipality has helped to lock it in a dynamic of extractive stagnation. "The economy is stopped, not necessarily because of the embargo," a TNC employee told me, "logging has declined and ranching is not expanding. New deforestation is mostly from settlements. …There are large external groups that own forested areas in Cotriguaçu. …They have not opened land here because it has not yet become economical" (TNC20 140428).

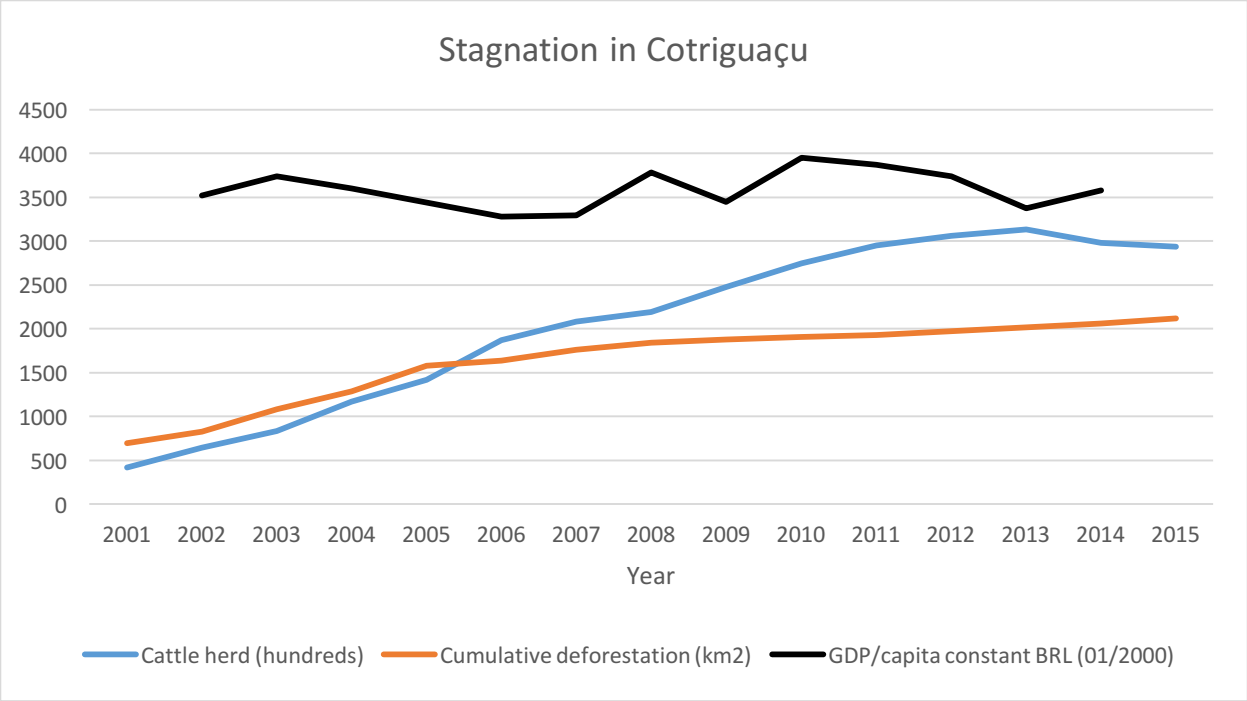
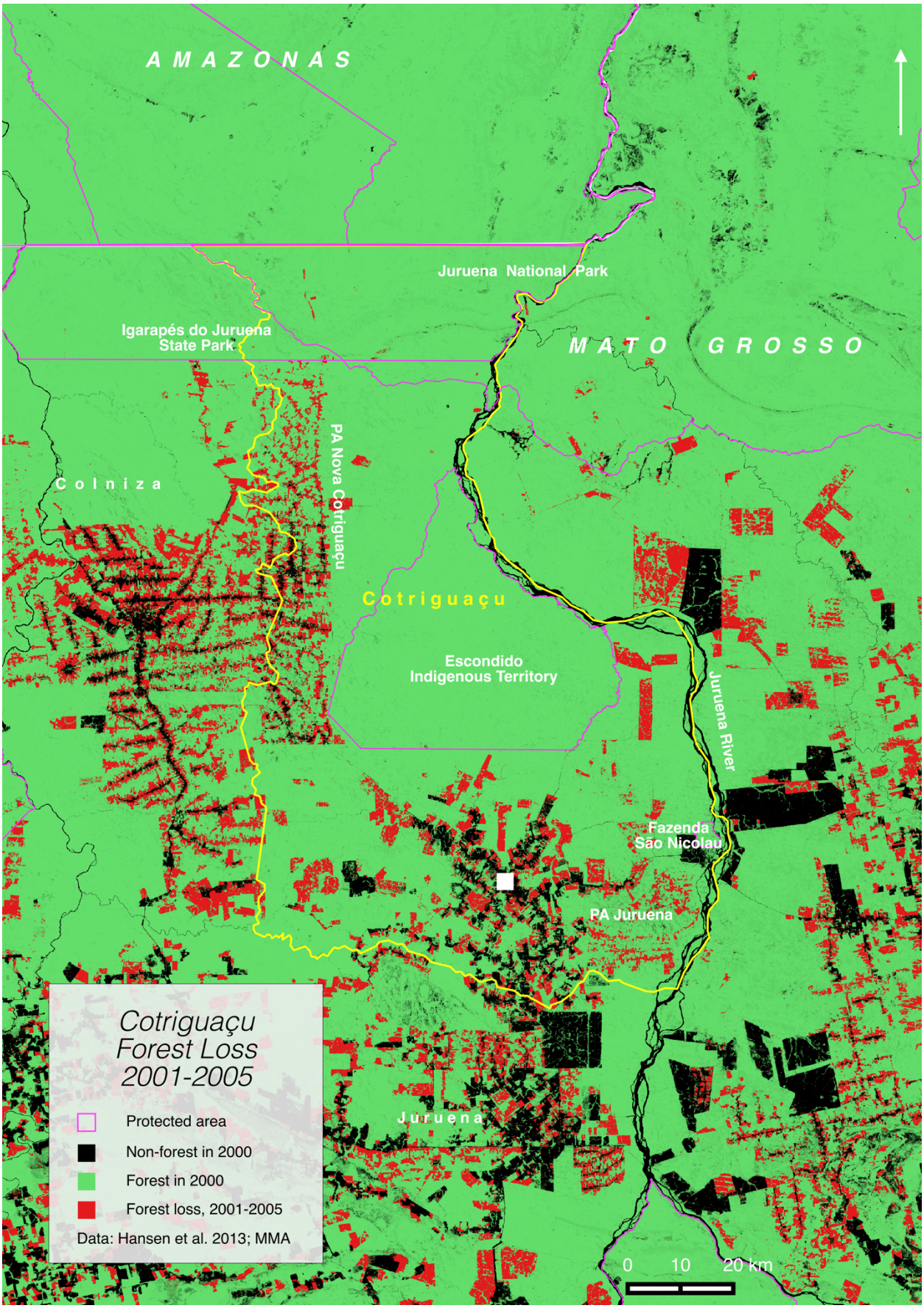


Figure 6.20: Stagnation in Cotriguaçu. Cattle herd figures are from IBGE (2016c). Real municipal GDP per capita is calculated from IBGE's 2010 Reference municipal GDP series (IBGE 2017b) with IBGE population estimates and adjusted to constant BRL using the Brazilian Consumer Price Index - IPCA (IBGE 2017c).

"I'm sure that if I went there today, nothing would have changed," a former TNC manager mused (TNC19 140502), and in many ways, she was right. The real municipal GDP of Cotriguaçu has been stagnant for a decade, and in 2014 it ranked 138th out of 141 municipalities in Mato Grosso (IBGE 2016b). Legal logging has remained more or less constant while illegal logging has declined, and deforestation and the cattle herd have leveled off since the late 2000s (Figure 6.20). Processes of land concentration continue, but without overall increases in investment or productivity. Even a former mayor told me that if he could, he would sell up and go someplace else. The land sparing coalition in Cotriguaçu has thus far failed to catalyze a productivist transformation in the municipality, largely due to its inability to supply capital to support infrastructure development and intensification. The soy frontier has begun to arrive in Juína, 160 km to the south, but industrial field agriculture is unlikely to enter Cotriguaçu due to the rocky,

hilly landscape, which would make cultivation difficult even if infrastructure were improved (TNC20 140428). The most immediate prospect for economic transformation in the municipality comes from federal government proposals for hydroelectric dams in the Juruena and Aripuanã River basins. The dams, which could inundate substantial portions of the national park and indigenous territory, are still in planning stages. Nonetheless, the prospect of the hydroelectric projects has touched off land speculation in the Nova Cotriguaçu settlement, where residents expect the dams to bring jobs and improved roads and electricity (ICV04 140619). Until that time, Cotriguaçu appears likely to continue its trajectory as an extractive periphery of declining timber extraction, struggling smallholders, and extensive ranching that concentrates land in large holdings without increasing productivity or stimulating municipal development.

Figures 6.21-22: 6.21) Map of Cotriguaçu showing forest loss in 2001-2005, during the peak of deforestation in the Brazilian Amazon; 6.22) Map of Cotriguaçu showing forest loss in 2001-2014. Protected areas are shown with 2017 boundaries. PA (*projeto de assentamento*) denotes an agrarian reform settlement. Most forest loss after 2005 occurred in settlements. The municipal seat is denoted by a white square.


AMAZONAS
Juruena National Park
Igarapés do Juruena
State Park
MATO GROSSO
PA Nova Cotriguaçu
Colniza
Cotriguaçu
Escondido
Indigenous Territory
Juruena River
Fazenda
São Nicolau
PA Juruena
Juruena
Cotriguaçu
Forest Loss
2001-2005
Protected area
Non-forest in 2000
Forest in 2000
Forest loss, 2001-2005
Data: Hansen et al. 2013; MMA
0
10
20 km


AMAZONAS
MATO GROSSO
Juruena National Park
Igarapés do Juruena
State Park
PA Nova Cotriguaçu
Colniza
Cotriguaçu
Escondido
Indigenous Territory
Juruena River
Fazenda
São Nicolau
PA Juruena
Juruena
Cotriguaçu
Forest Loss
2001-2014
Protected area
Non-forest in 2000
Forest in 2000
Forest loss, 2001-2014
Data: Hansen et al. 2013; MMA
0
10
20 km

Comparative Analysis: Nova Ubiratã and Cotriguaçu

Nova Ubiratã and Cotriguaçu illustrate two extremes on the spectrum of land sparing modernization in the Brazilian Amazon. In both municipalities, territorial constriction imposed by the federal government has led to major reductions in deforestation. Nova Ubiratã has effectively transitioned from an extractive logging and ranching economy to a productivist economy of intensified ranching and industrial row crop production, albeit with hiccups of large-scale deforestation by speculators. The municipality today exemplifies the land sparing narrative of 'decoupling' of agricultural production and deforestation in the Amazon. Cotriguaçu, meanwhile, has stagnated with an extractive economy based on logging and extensive ranching. Figure 6.23 illustrates the dramatic difference in real municipal GDP per capita between the two municipalities.

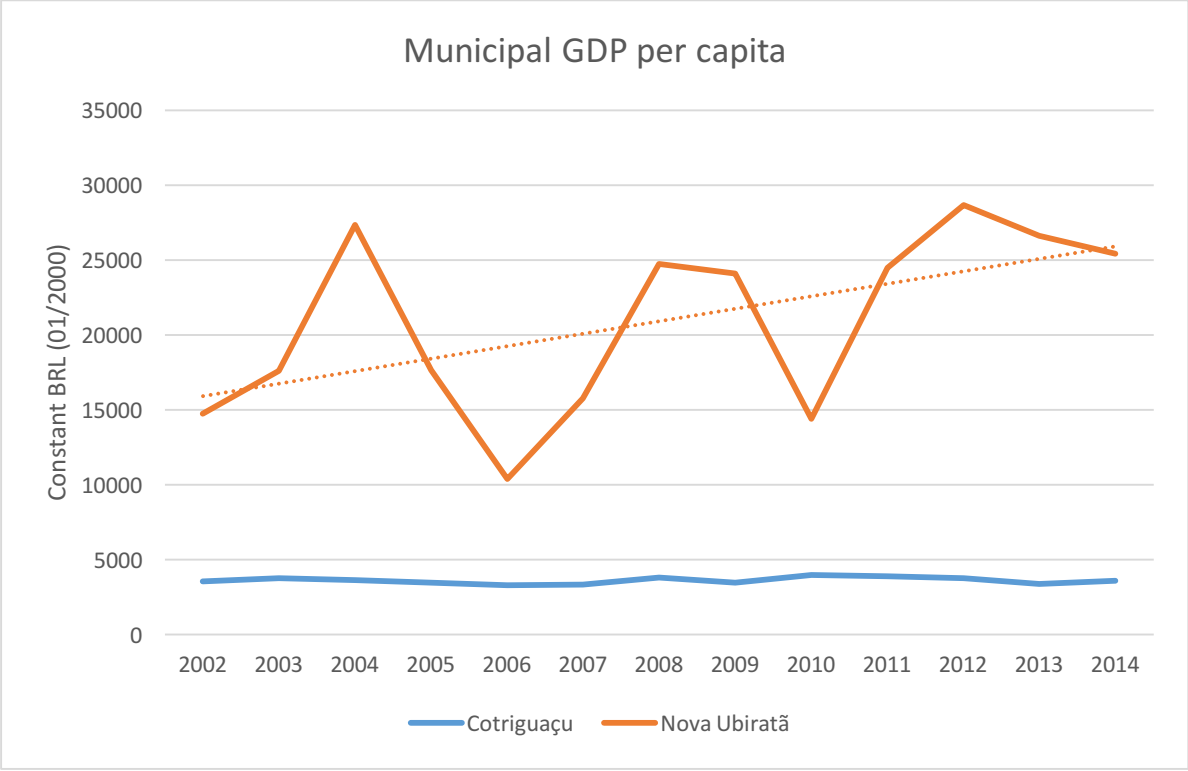


Figure 6.23: Real municipal GDP per capita in Nova Ubiratã and Cotriguaçu, calculated from IBGE's 2010 Reference municipal GDP series (IBGE 2017b) with IBGE population estimates and adjusted to constant BRL using the Brazilian Consumer Price Index - IPCA (IBGE 2017c).

The productivist transition in Nova Ubiratã has occurred despite the relatively weaker land sparing coalition in the municipality. TNC was present in Nova Ubiratã and the mayor was strongly engaged in promoting CAR registration, monitoring deforestation, and promoting tenure regularization. The scope and scale of this coalition at the municipal level pales compared to the land sparing coalition in Cotriguaçu, however, which was initially targeted for a REDD project, and where TNC, ICV, and ONF ended up working alongside a motivated Environment Secretariat to support not only CAR registration, but also a host of municipal governance and economic development interventions.

The divergent outcomes of land sparing interventions in these two municipalities are due primarily to the geography of the soy frontier. Scholars have described the development of the coupled Amazonian soy and cattle frontiers by drawing on von Thünen's classic model of location rent, which posits that land use is determined by land rents and land rents are determined by distance from a commercial center (Kaimowitz and Angelsen 2008; Walker et al. 2009). Under the von Thünen model, we would expect industrial field agriculture and intensive ranching, which are more productive land uses than extensive ranching, to occur closer to productivist centers, while in more remote areas with lower land rents, extensive ranching will be more common. The basic von Thünen model can be modified to take into account other factors such as land quality and supply chain configurations (Bowman et al. 2012). The initial establishment of agro-industrial centers in particular locations may be partly determined by infrastructure and state incentives and investments, as well as institutional factors such as land tenure and environmental regulations (Garrett, Lambin, and Naylor 2013a; Garrett, Lambin, and Naylor 2013b), but once those

commercial centers emerge, the location rents they generate structure the geography of frontier expansion.

Garrett et al. (2013b) study the municipality of Sorriso as an archetypical agro-industrial agglomeration, and the proximity of Nova Ubiratã to Sorriso and its good land quality virtually guaranteed that municipal land would be reallocated to more intensive land uses. At the same time, the environmental restrictions of the priority list may for the time being have prevented Nova Ubiratã from attracting investment in storage and processing facilities that would move it further up the industrial commodity chain. In Cotriguaçu, meanwhile, financing from the Amazon Fund or Fundo Vale for a few million dollars cannot compensate for the high transportation costs and more broken terrain, which limit land rents in the municipality. Even if ranchers invest in more intensified cattle production, investments and institutional development from the state or private corporations would still be needed to catalyze a productivist transformation. A major hydroelectric project may be the most likely catalyst for ending the municipality's extractive stagnation. In terms of municipal political-economic regimes, both Nova Ubiratã and Cotriguaçu have transitioned toward productivist municipal governments that participate in land sparing coalitions. Economic transformations have consolidated a more productivist political-economic elite in Nova Ubiratã, however, while extractive loggers and ranchers still hold political clout in Cotriguaçu, and a nucleus of productivist large ranchers is still in its nascency. In both municipalities, environmental governance has unequally impacted smallholders, and land concentration is increasing, with or without agricultural intensification. In Part II of this chapter, I turn to the State of Pará, where the municipalities of São Félix and Novo Progresso represent active deforestation frontiers that have been the most dynamic spaces for the application of land sparing forest governance.

Part II: Pará

The history of Pará closely mirrors the history of the Amazon region recounted at the beginning of the chapter. While Mato Grosso poses something of an exception due to its large area of Cerrado, long history of ranching, and early adoption of soy agriculture, the State of Pará lies fully in the Amazon biome, and from its position at the mouth of the Amazon River it has been a conduit for the development of the entire Amazon Basin. Belém was a capital of the rubber boom, and southeastern Pará was a major center of mahogany and brazil nut extraction.[66] Logging has been a mainstay of the economy since the colonial period, and mining, carried out by large companies such as Vale (most famously at Carajás) and by prospectors (most famously at Serra Pelada), has been a dominant economic sector especially since the 1970s. Extensive ranching supported by government credits and subsidies has driven large-scale deforestation in Pará since the 1970s. Between 1988 and 2016, Pará lost 143,159 km^2 of forest, comprising 34 percent of total deforestation in the Brazilian Amazon, and since 2006 it has been the Amazonian state with the highest annual deforestation rate.

The extractive political-economic regime in Pará has been bolstered by systematic corruption and violent dispossession of indigenous peoples, other traditional populations, and small farmer colonists. Jader Barbalho, who has served as governor, federal deputy, and senator of Pará, is accused of having coordinated the diversion of billions of reais from SUDAM, and a former state Secretary of Environment claims that half of timber production in the state is illegal and corruption in SEMA, the Environmental Secretariat, is endemic (Luíse 2011). Loggers, ranchers, and their hired guns have expanded timber extraction and consolidated large ranches through violent land grabs, gaining infamy for southern Pará as "Brazil's most dangerous badland"

[66] Brazil nuts are known in Portuguese as *castanha-do-pará*, or 'Pará chestnuts.'

(Simmons et al. 2007; Simmons 2004; Souza et al. 2015). The 2005 murder of Dorothy Stang, an American-born nun who since the 1970s had been an advocate for small farmer land rights in Pará, provided a stark reminder of the dangers of challenging extractive interests in the region, and gave additional impetus to the implementation of PPCDAm and the creation of protected areas in the Terra do Meio (Abranches 2014, 24–25).

With the emergence of the land sparing complex in the Brazilian Amazon and the launch of PPCDAm, the state government of Pará has also adopted policies to limit deforestation and support a productivist transition, though an extractive coalition maintains considerable power in state-level politics. State protected areas were designated alongside federal areas, including the Triunfo do Xingu Environmental Protection Area in São Félix, created in 2006. In 2007, as deforestation ticked upward with the rise in global commodity prices, Valmir Ortega, Director of Ecosystems at IBAMA, was brought in to be state Secretary of the Environment. Ortega cracked down on illegal logging and sought to root out corruption in the Environment Secretariat – more than 70 SEMA employees were removed for corruption during his two years as Secretary – but he was opposed and undermined by logging interests to the point where he resigned in mid-2009 (Luíse 2011; TNC09 140217). In 2008, Pará became one of the founding members of the Governors' Climate and Forests Task Force.

Pará did not have Mato Grosso's early experience with environmental registration through SLAPR, but after the creation of CAR in Mato Grosso, Pará also began to develop an environmental registry from 2007 onwards. The Ministry of Environment's priority list was created in 2008, and the municipality of Paragominas, in northeastern Pará, launched a municipal initiative to exit the list, with support from TNC and IMAZON, a Brazilian environmental NGO based in Belém. Paragominas succeeded in negotiating with the Ministry of Environment to accept

CAR in lieu of a full review of land titles as a criterion for leaving the priority list, and in 2010 Paragominas became the first municipality to exit the list. The example of Paragominas' 'Green Muncipality' project was then heavily promoted by the state and federal government and environmental NGOs including TNC as a model for combating deforestation and supporting municipal environmental governance (Guimarães et al. 2011). In March 2011, Pará launched a Green Municipalities Program, based on the Paragominas model, to combat deforestation and promote sustainable rural activities through CAR implementation and municipal capacity building. Other state programs have been made conditional on adhering to this program, such that by December 2015, 107 out of 144 municipalities in Pará had joined.

Prosecutors for the Federal Public Ministry (MPF) in Pará, in particular Daniel Azeredo, have been key actors in promoting environmental governance in the state and throughout the Amazon region (McAllister 2005; Pegurier 2016). In 2009, MPF began requiring slaughterhouses to purchase cattle only from properties with CAR, which substantially increased CAR registration by ranchers (Gibbs et al. 2016). MPF has also required municipalities to agree to municipal 'pacts' for the control of deforestation in order to extend environmental compliance deadlines for rural producers, and in 2012, Azeredo brought a civil action against INCRA for its failure to ensure environmental compliance in agrarian reform settlements.

Annual deforestation in Pará declined 80 percent from its 2004 peak to its lowest point in 2012, but since 2012 deforestation has again accelerated (Figure 6.24), calling into question the completeness and durability of Pará's land use transition. The municipal case studies of São Félix and Novo Progresso illustrate the actions of land sparing coalitions on the Pará frontier and the uneven and contested trajectory of the productivist transition these coalitions seek to realize. Since 2003, TNC's Amazon Conservation Program has directed its forest conservation activities in Pará

out of a regional office in Belém. The municipality of São Félix do Xingu has been the site of a major TNC REDD program, and is considered by TNC staff as the municipality where their programs have been most successful. TNC staff reported that their programs had been least successful in the municipality of Novo Progresso, where a CAR project funded by Fundo Vale largely failed to advance.

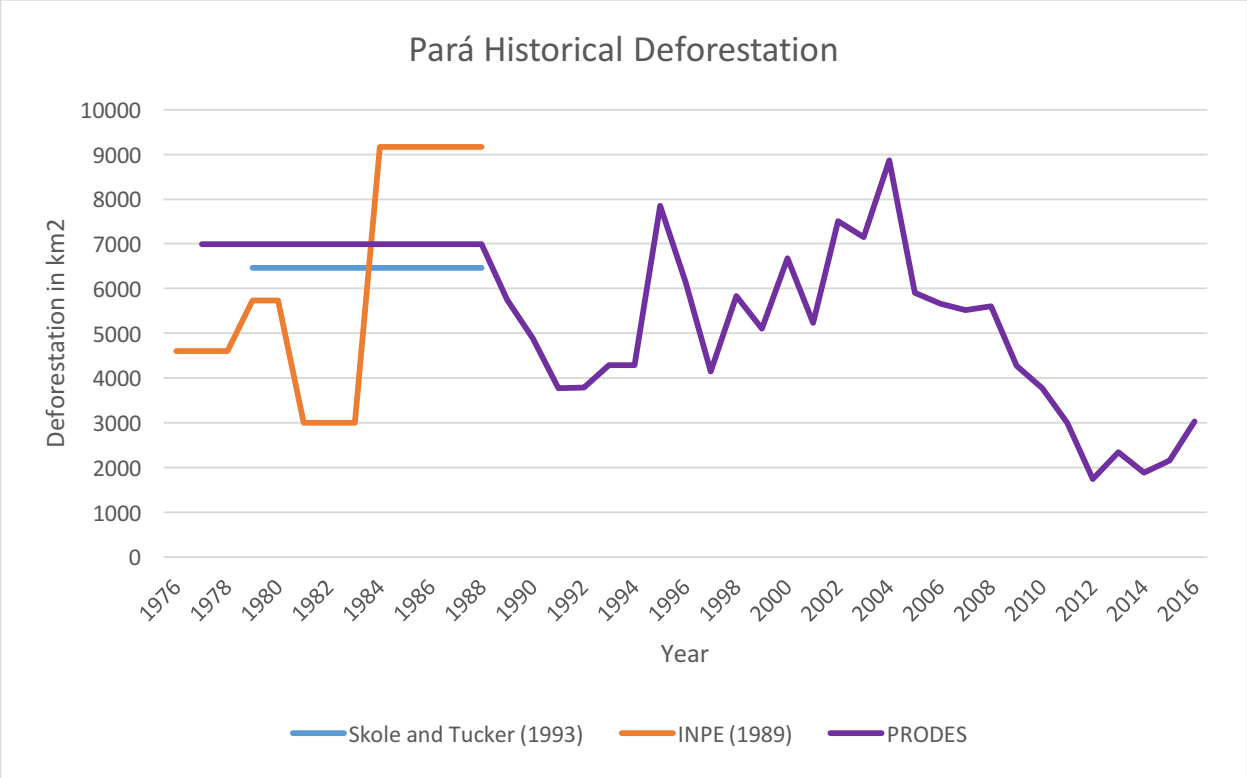


Figure 6.24: Historical deforestation in Pará.

São Félix: Effective Constriction and Stagnation

São Félix, covering 84,213 km^2 in southeastern Pará, experienced rapid population growth and land cover change beginning in the late 1970s, catalyzed by construction of a highway to the municipality (Schmink and Wood 1992). Ranching expansion in the 1990s-2000s drove large-scale deforestation, and almost all occupation occurred without formal land title. The soy frontier remains distant, and the hilly and rocky terrain is considered difficult for industrial cropping, so

land use change is dominated by ranching (Figure 6.25). In 2000-2007, deforestation in São Félix averaged 1200 km^2/year, while the municipal population jumped from 35,000 to 60,000 (IBGE 2016). During the same period, the municipal cattle herd increased from 682,000 to 1.6 million head (IBGE 2016c), becoming the second-largest municipal herd in Brazil. Deforestation advanced westward as small farmers and large ranchers moved into the Terra do Meio region west of the Xingu River (Castro, Monteiro, and Castro 2002), threatening to break through to the BR-163 highway running through Novo Progresso in western Pará.

Figure 6.25: Looking towards São Félix town from the far side of the Rio Fresco, 24 July 2014. The terrain is hilly and rocky, and most deforested land is used for extensive ranching.

To forestall this frontier expansion, small farmers along the Transamazon highway north of Terra do Meio found common ground with environmentalists in Brazilian and international

NGOs to work with the Brazilian Government to create a mosaic of protected areas (Campos and Nepstad 2006). In addition to existing indigenous territories, which today cover 53 percent of São Félix, the federal government in 2005 created two new strictly-protected conservation areas. Large ranchers organized to oppose the protected areas. They succeeded in altering some conservation area boundaries and in ensuring that the Triunfo do Xingu protected area, created in 2006 by the State of Pará, was designated as an Environmental Protection Area (APA), allowing private occupation and 'sustainable use' (Taravella and Arnauld de Sartre 2012). Nonetheless, properties in federally-protected zones were expropriated and cattle grazing within the areas were seized. With the new protected areas, 19 percent of municipal territory fell under conservation areas, virtually all territory west of the Xingu had protected status, and just 28 percent of the municipality remained unprotected private property space (Figure 6.28).

Protected area creation and enhanced enforcement under PPCDAm drove significant deforestation reductions in São Félix after 2005. Deforestation declined 37 percent, from 1268 km^2/year in 2003-2005 to 800 km^2/year in 2006-2008, and logging activity, which had been closely linked to frontier expansion, also declined significantly (Figure 6.26). In 2008, the priority list was created, accompanied by credit restrictions and robust enforcement. In 2009, TNC and IEB, a Brazilian NGO, launched projects aimed at reducing deforestation with support from Frigol, a local slaughterhouse, and Fundo Vale. The large ranchers initially were hostile to the NGOs, but when public prosecutors began forcing slaughterhouses only to receive cattle from properties with CAR, the ranchers' syndicate (SPR) began to work with the NGOs and government to achieve environmental compliance. Deforestation bottomed out in 2011 at 140 km^2, a 90 percent reduction from 2005 (Figure 6.26). That year, CAR registration in the municipality exceeded 80 percent of

private property space,[67] and a Pact for the End of Illegal Deforestation was signed by stakeholders including municipal, state, and federal government entities; local, national, and international NGOs; and ranchers', farmers', and community organizations. In signing the Pact, rural producers committed not to deforest illegally and to adopt more sustainable practices, while government agencies and NGOs committed to provide technical assistance and credit for sustainable production, to maintain infrastructure, and to facilitate environmental licensing and tenure regularization.

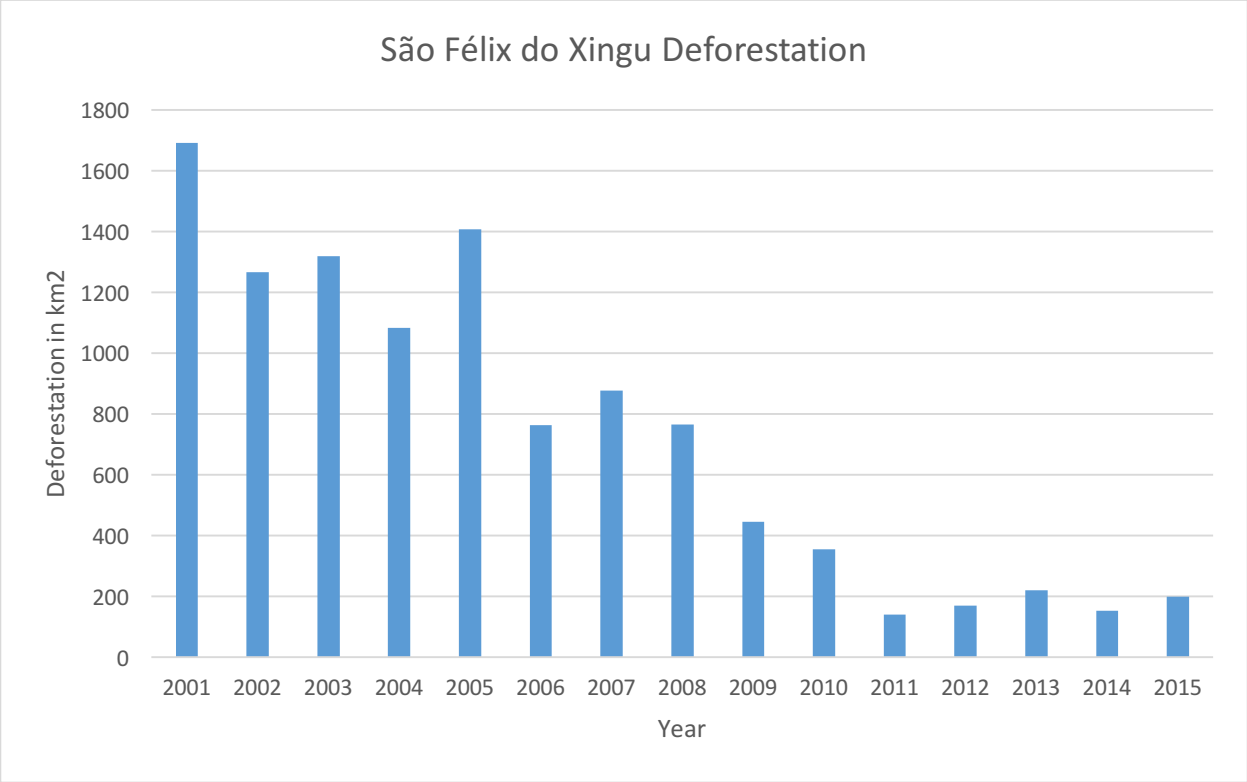


Figure 6.26: Annual deforestation in São Félix, 2001-2015.

[67] As of May 2017, São Félix had over 3,800,000 ha registered in CAR, exceeding the legally available agricultural area by over 500,000 ha. Over 150,000 ha have been registered in indigenous territories and nearly 120,000 ha have been registered in conservation areas, reflecting continued contestation over tenure and protected areas in the municipality (SFB/MMA 2017).

As this history shows, territorial constriction has been central to environmental governance in São Félix. Protected areas closed the western frontier, limiting and encircling the available area for agricultural expansion. Heavy enforcement rendered constriction effective, as fear of punitive measures led many to reduce or cease forest clearing. Ranching intensification is almost universally considered the necessary response to this new land constraint.

Although government officials, NGO activists, ranchers, and small farmers all recognize the necessity of increasing productivity on already-deforested land, intensification has not occurred automatically with constriction. Almost all properties lack formal title, which might facilitate investment, and by November 2015, Terra Legal had issued just 26 titles in rural São Félix (Ministério do Desenvolvimento Agrário 2015). Some larger ranchers with access to credit or capital reserves have adopted more intensive practices, such as restoring degraded pastures and implementing pasture rotations, but many land managers lack access to necessary capital, equipment, and knowledge to intensify. The collateral effect of deforestation reductions has therefore been a freeze in the agricultural sector in São Félix. Residents speak of economic stagnation, and real municipal GDP per capita declined after 2006 (Figure 6.35). According to a small farmer living in the APA:

> "Until the new regulations, we worked normally. We received financing from the bank to buy cattle, and everything was going well until 2009…Now we are isolated, and anything we do is repressed. We have been frozen in place." (SFX08 140206)

Farmers cannot deforest new land to expand, nor do they receive assistance to intensify.

Realizing intensification might not occur spontaneously, TNC has launched initiatives supporting new production practices. The organization's sustainable ranching project, established in 2013 in partnership with Walmart and Marfrig, has supported around 20 primarily medium and large ranchers to intensify and pursue tenure regularization (Figure 6.27). TNC's sustainable cacao

project, begun in 2013 with financing from Cargill, works with nearly 60 smallholders to recover degraded lands with cacao agroforestry. These projects are intended to be replicable and scalable, TNC staff affirm, and have been complemented by support for sustainable production from IEB and MMA, but these initiatives presently reach a small proportion of the 10,000 rural properties in São Félix. Support promised by federal and state governments for infrastructure, technical assistance, credit, and land titling has mostly failed to materialize.

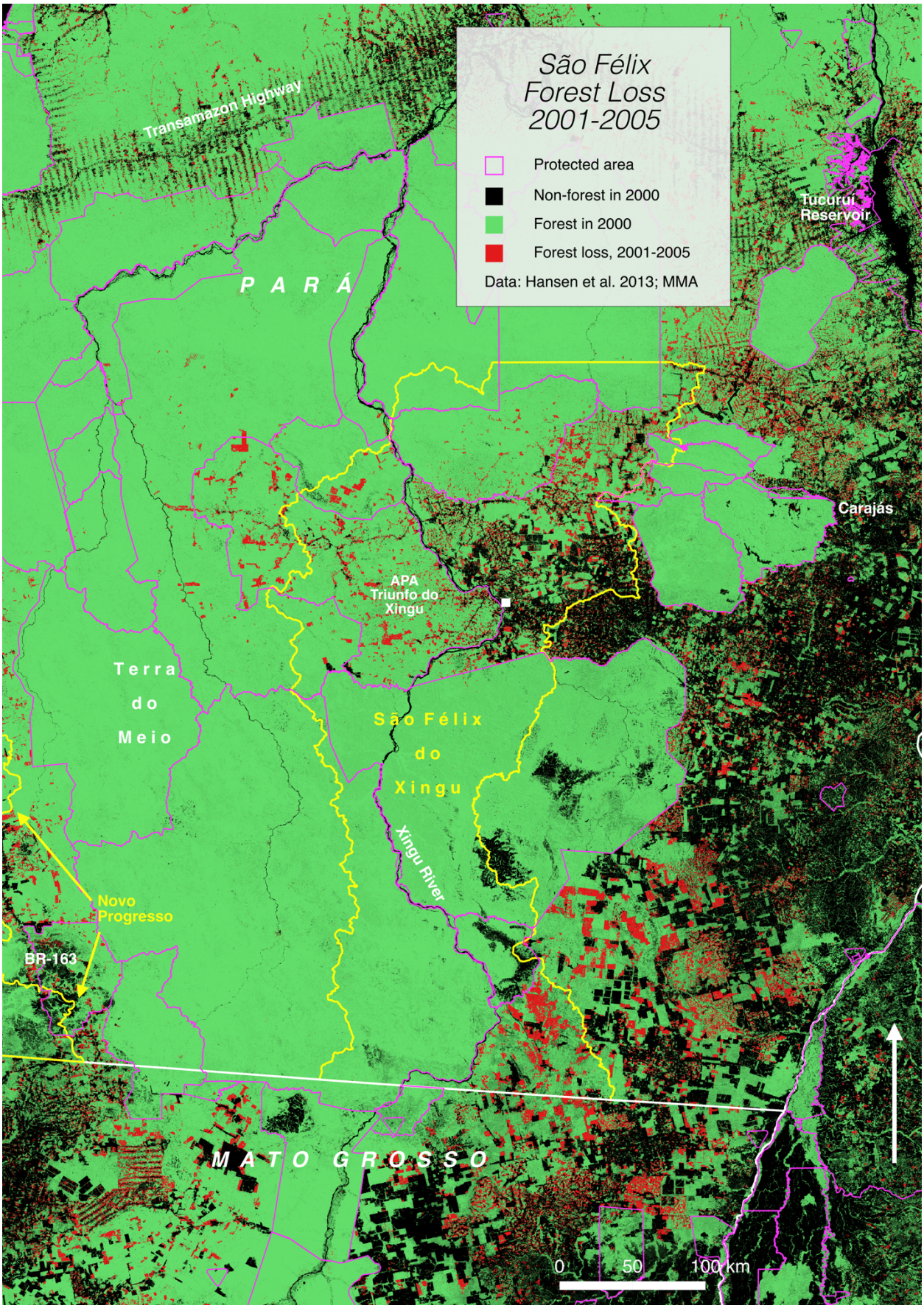
Figure 6.27: A team from TNC's ranching intensification project visits workers' quarters on a fazenda in São Félix, 14 February 2014.

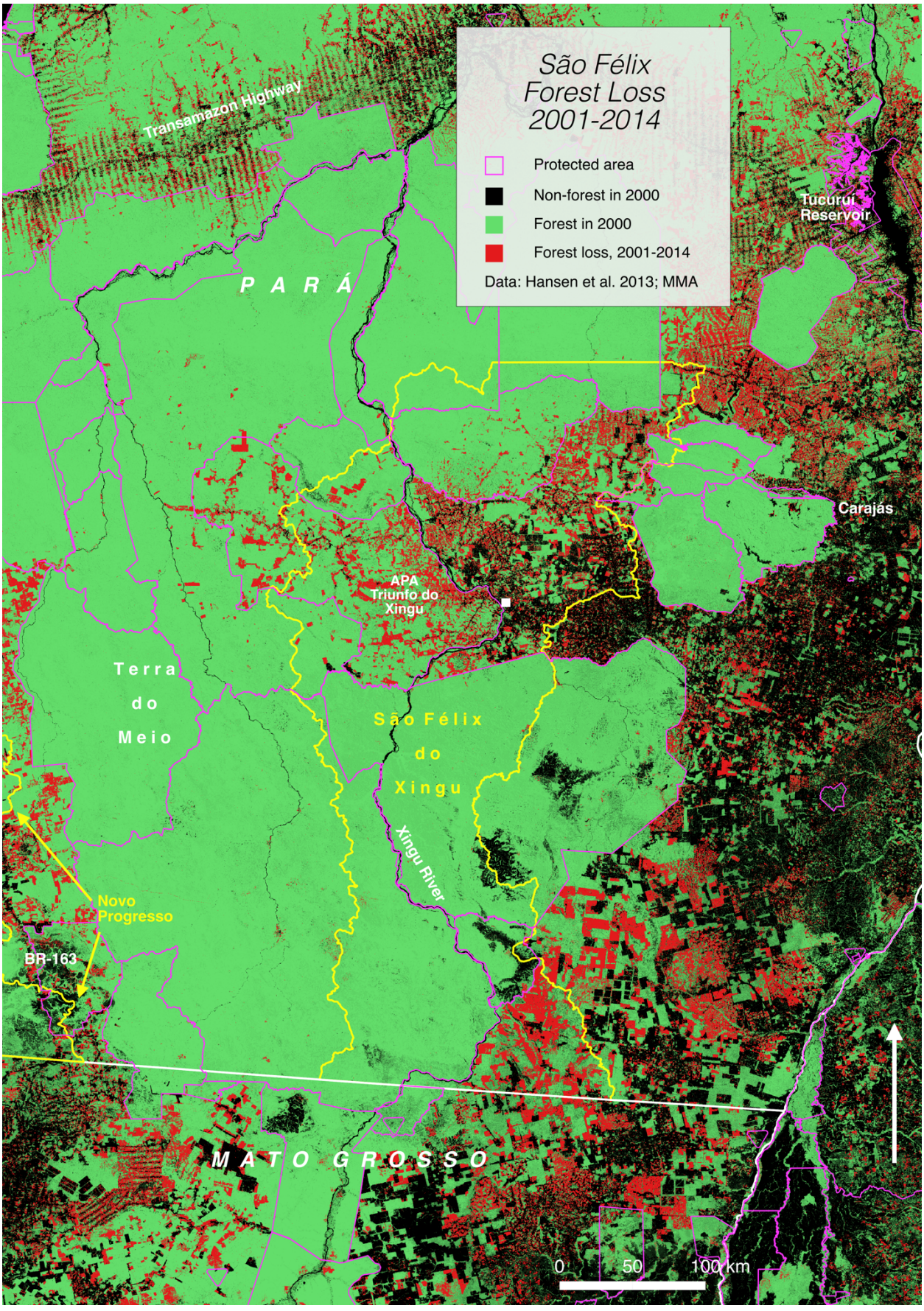
Without substantial investments supporting intensification, and with incomes stagnating, two trends have emerged. First, deforestation began to rebound, climbing to 223 km^2 in 2013 (Figure 6.26). As the Municipal Secretary of Environment explained, "people are afraid of

enforcement actions, so they wait for public policies, but when public policies don't come, they decide to run a risk and deforest" (SFX01 140129). Second, as small farmers struggle under the new enforcement regime, there has been an increasing tendency for smallholders to sell their properties and move to cities or other parts of the frontier, according to multiple informants, and this tendency further concentrates land in the hands of large ranchers (SFX04 140204; EMATER01 140130).

São Félix has been characterized by a relatively strong land sparing coalition of government, NGO, and corporate actors (Table 6.2). Command-and-control measures, including protected area creation and Forest Code enforcement, have dramatically reduced deforestation. Credit restrictions, regional legal action against slaughterhouses, and TNC and MMA projects also succeeded in bringing over 80 percent of private property area into CAR. Pressure under territorial constriction for a transition from an extensive mode of extraction to an intensive mode of production is widely felt. Yet ranching intensification is still incipient, and without substantial financial support or technical assistance, territorial constriction through environmental regulation has resulted in state-building in a coercive mode, but not yet agricultural intensification and socio-economic development. Environmental governance is favoring more productivist management among large ranchers, while smallholders struggle – and in many cases fail – to adapt.

Figures 6.28-29: 6.28) Map of São Félix showing forest loss in 2001-2005, during the peak of deforestation in the Brazilian Amazon; 6.29) Map of São Félix showing forest loss in 2001-2014. Protected areas are shown with 2017 boundaries. The municipal seat is denoted by a white square.


São Félix
Forest Loss
2001-2005
Protected area
Non-forest in 2000
Forest in 2000
Forest loss, 2001-2005
Data: Hansen et al. 2013; MMA
Transamazon Highway
PARÁ
Tucuruí
Reservoir
Carajás
APA
Triunfo do
Xingu
Terra
do
Meio
São Félix
do
Xingu
Xingu River
Novo
Progresso
BR-163
MATO GROSSO
0
50
100 km


São Félix
Forest Loss
2001-2014
Protected area
Non-forest in 2000
Forest in 2000
Forest loss, 2001-2014
Data: Hansen et al. 2013; MMA
Transamazon Highway
PARÁ
Tucuruí
Reservoir
Carajás
APA
Triunfo do
Xingu
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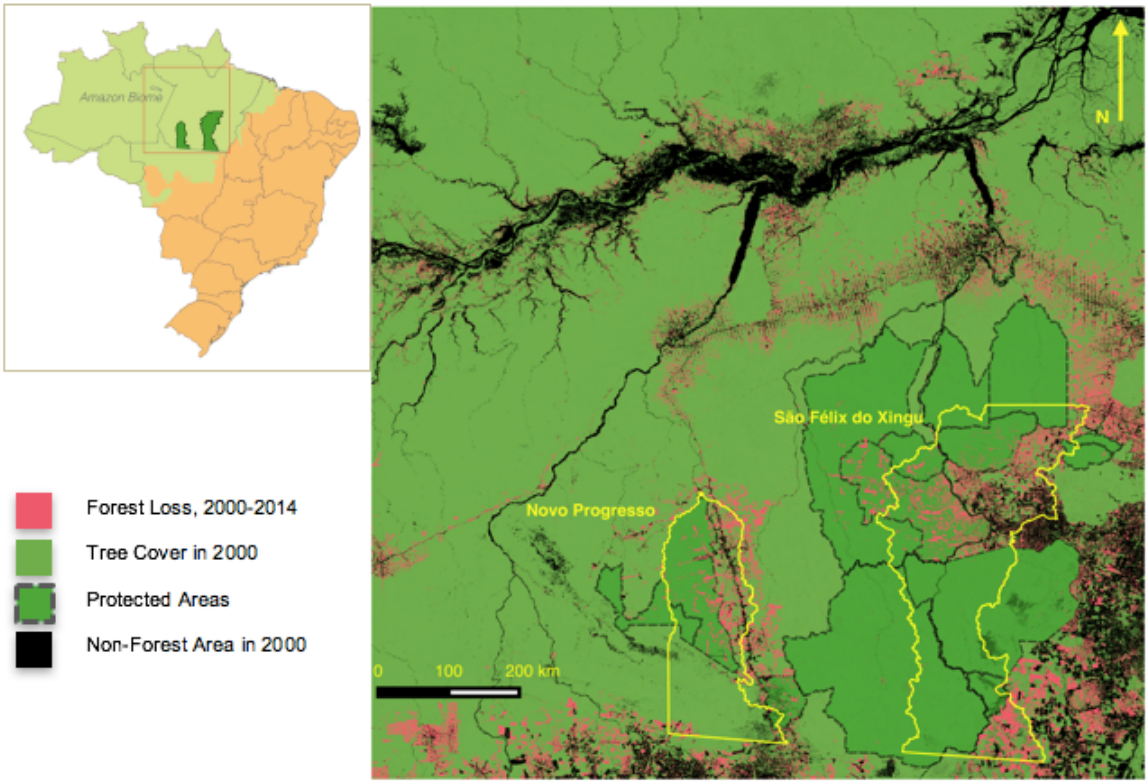


Figure 6.30: São Félix do Xingu and Novo Progresso**.** Military area in southern Novo Progresso not shown. Protected areas overlapping the municipalities are shown with 2015 boundaries. Data: MMA; Hansen/UMD/Google/USGS/NASA.

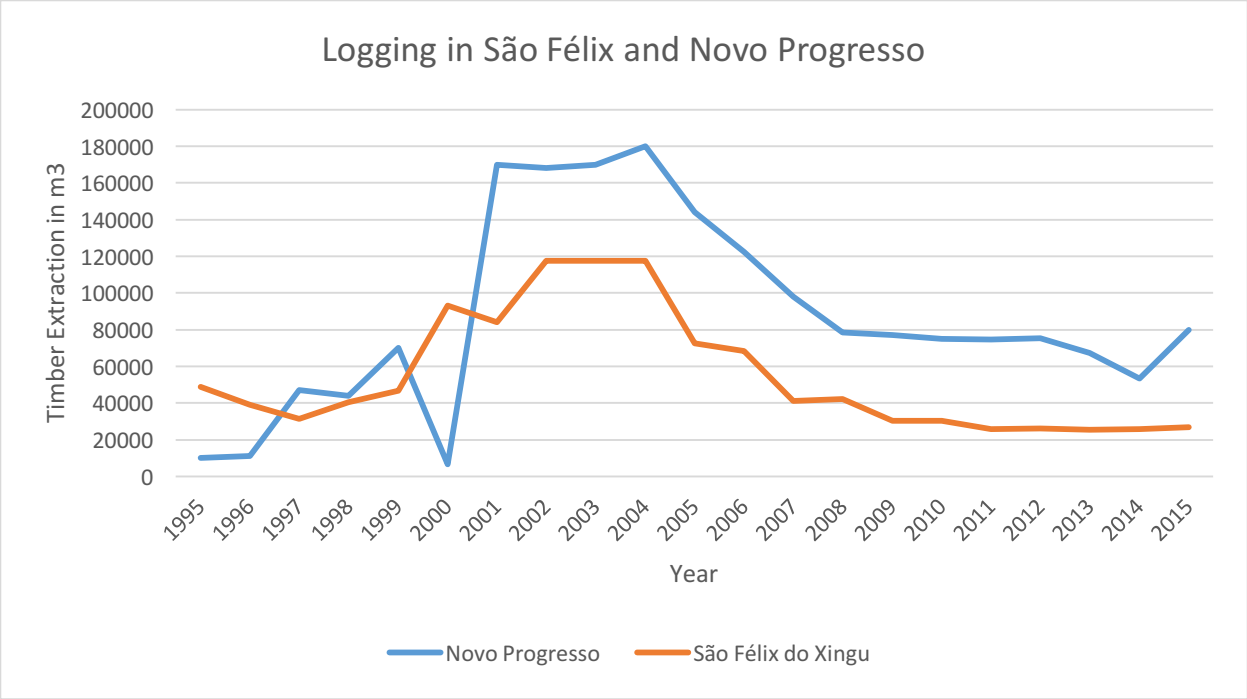


Figure 6.31: Annual timber extraction in São Félix and Novo Progresso, 1995-2015 (IBGE 2017a).

Novo Progresso: Incomplete Constriction, Extractive Expansion, and Soy

Novo Progresso, in southwestern Pará, covers 38,162 km^2 along either side of the north-south BR-163 highway (Figure 6.32), which links soy-producing Mato Grosso with ports on the Amazon. Colonization of Novo Progresso began with the highway's opening in the 1970s, and has occurred largely without formal land titling. A gold rush in the early 1980s drew settlers, followed by a shift toward logging and ranching. Soy expansion in Mato Grosso has driven growth along the BR-163 corridor, and industrial row-crop agriculture is entering southern areas of Novo Progresso. The municipality experienced large-scale deforestation during the early 2000s, averaging 465 km^2/year in 2000-2005, and logging activity spiked in correlation with new forest clearing (Figures 6.31 and 6.33).

Figure 6.32: The BR-163 Cuiabá-Santarém highway in the center of Novo Progresso, 21 March 2014.

The implementation of PPCDAm has played out in Novo Progresso through conflicts between a thin land sparing coalition comprising primarily external actors and a strong coalition supporting frontier expansion. In 2006, the federal government created Jamanxim National Forest (FLONA) in western Novo Progresso at the same time as the Terra do Meio protected areas to the east. FLONA Jamanxim covered 13,000 km^2, and when combined with a biological reserve created in 2005 and a restricted military area in the municipality's southern half, there remained just 9898 km^2 of legally-available private property space in Novo Progresso: 25.9 percent of the municipality's total area, located in a 50 km-wide corridor bisected by BR-163 (Figure 6.36). The FLONA's creation generated significant resistance. Demarcation occurred with little local input,

FLONA boundaries were not made clear to the population, and its creation expropriated people who had occupied the area for decades (NP04 140320; NP01 140318). Deforestation was not immediately reduced, rising from 254 km^2 in 2006 to 348 km^2 in 2007 (Figure 6.33). Novo Progresso entered the MMA priority list in 2008, bringing credit restrictions and enhanced enforcement. In 2009, as elsewhere, slaughterhouses began to purchase only from properties with CAR.

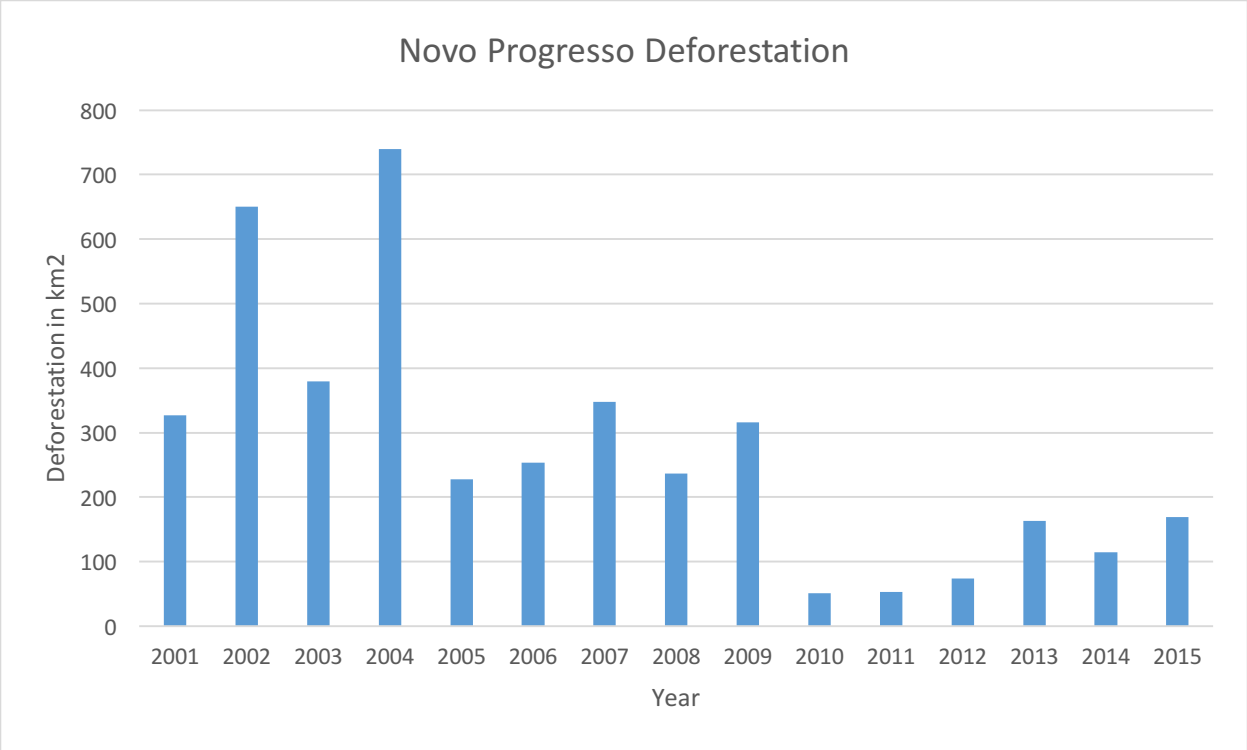


Figure 6.33: Annual deforestation in Novo Progresso, 2001-2015.

Novo Progresso residents chafe at the constriction of their potential agricultural area. Agamenon Menezes, president of the ranchers' syndicate, laments that Novo Progresso is left with "just a tiny corridor to work in, and even then they want to prohibit activities" by enforcing the Forest Code on private properties (NP03 140319). Ranchers and their ruralist advocates have sought reduction of the FLONA from the federal judiciary, executive, and legislature, and there

have been periodic protests by municipal residents. On the other side, IBAMA has engaged in numerous enforcement actions, including confiscating cattle grazing illegally within the FLONA.

There has also been substantial resistance to CAR. Seeing CAR as a state enforcement tool, many landowners chose not to register in order to "stay hidden" and continue clearing, according to a state extension agent (EMATER03 140327; also NP01 140318). Those who completed CAR have generally done so to access credit or sell to slaughterhouses, but according to one rancher, "those who are well-prepared don't need CAR": they have alternative financing sources and can launder cattle through someone else's CAR (NP02 140319), or they register only part of their property and continue to deforest in the unregistered portion (EMATER03 140327) (Figure 6.34).

Figure 6.34: Painted on the wall of the rural producers' syndicate, the quotation reads: "When the *Law* ignores reality, reality *takes revenge* by ignoring the Law." Needless to say, the ranchers in

Novo Progresso are not very keen on the law. Georges Ripert, author of the quotation, was a French jurist. 24 March 2014.

Political leaders in Novo Progresso have abetted resistance to environmental regulation. In 2011, when TNC prepared to enter the municipality to support CAR and Pará's Green Municipalities Program, Agamenon of the ranchers' syndicate vociferated before the town council:

> "For years we have been fighting against these international interests in the region… 'Zero deforestation' does not exist, it is impossible to accept this imposition by the government. If this happens, we will burn their cars and expel them from the city. We don't want NGOs here." ("Presidente Do Sindicato…" 2011)

Agamenon's conflation of government and NGOs speaks to the alliance of these actors in a land sparing coalition seeking to change the practices of ranchers like himself.

Osvaldo Romanholi, elected mayor in 2012, was president of the loggers' syndicate and during his campaign pledged to expel IBAMA from the municipality. "Political power is in the hands of those who profit from illegality," one rancher observed (NP02 140319). In 2014, the town council removed Romanholi for fiscal impropriety, and in 2015 the federal government arrested members of a local criminal ring coordinating land grabbing and deforestation, but substantial deforestation continued.

Despite the hostile context, TNC attempted to support CAR registration through a project funded by Fundo Vale in 2011-2012. The project encountered difficulties, largely due to weak support from the municipal government and antagonism from the ranchers' syndicate, according to a local TNC employee (TNC14 140317). At the beginning of 2014, 60 percent of private property area in Novo Progresso was registered in CAR,[68] and TNC planned to return, initially within a project funded by multinational grain trader Bunge.

[68] As of May 2017, over 1,400,000 ha in Novo Progresso had been registered with CAR, exceeding the legally available area (before the reduction of FLONA Jamanxim) by over 450,000 ha (SFB/MMA 2017).

Deforestation declined substantially after creation of the priority list, from 316 km^2 in 2009 to 51 km^2 in 2010. There was a widespread perception, however, that federal enforcement primarily hurt smallholders, while some larger landowners continued to deforest with impunity, using wealth and political connections to evade fines and obstruct environmental policy. Deforestation rebounded in 2013-2014 to 139 km^2/year; less than half of 2009 deforestation, but far short of the reductions in São Félix. Decreased deforestation has been accompanied by reduction of the municipal cattle herd (IBGE 2016), due partly to embargoes on illegally deforested areas and pasture degradation in extensive ranching operations. Large ranchers who no longer deforest have begun to intensify production using their own resources, but reforming degraded pastures and adopting intensive rotations is generally too costly for smallholders without external support. Tenure regularization that might facilitate agricultural investment has advanced little. Although Terra Legal arrived in Novo Progresso in 2009 and quickly titled 233 properties (Brito and Barreto 2011), the program titled just 93 properties during the ensuing six years (Ministério do Desenvolvimento Agrário 2015). Campbell (2015b) reports that titling has been distorted by large ranchers to further consolidate land and power by laundering cattle from illegal ranches through titled smallholder properties.

The arrival of the soy frontier along BR-163 is deemed imminent by the local population. Even if soy expands only into pasture areas, it may indirectly drive deforestation by displacing ranching and increasing land values under conditions of ineffective territorial constriction. As an agricultural extension agent affirmed, "soy brings more money, more ambition, and more pressure" (EMATER03 140327).

Continued municipal economic growth in 2006-2010, when GDP per capita doubled (Figure 6.35), was likely driven partly by ranching expansion with illegal deforestation, as well as

by infrastructure improvements, logging, and high metals prices encouraging mining. Large landowners maintain profitability through ranching intensification, illegal deforestation, and in some cases a transition to field agriculture. Small farmers struggle from enforcement and lack of support, and the hostility of large ranchers toward NGOs damages smallholders, who are least able to independently afford environmental registration and investments in intensification.

In Novo Progresso, the land sparing coalition of federal agencies and TNC (with corporate support) has struggled to implement its agenda of territorial constriction and agricultural intensification through environmental governance. Command-and-control actions have reduced deforestation since 2009, but resistance to CAR, the FLONA, and NGOs, and domination of local politics by actors tied to illegal clearing and land speculation have stymied local land sparing coalition development. A shift from an extractive to a productive economy in the municipality may depend on an exogenous transition from ranching to field agriculture, though territorial constriction will be crucial to prevent intensification from driving indirect land use change in the FLONA and Terra do Meio. Recent events have continued to undermine constriction and reinforce extractive deforestation, however. In December 2016, in a victory for the extractive coalition, the Temer government announced a 43 percent reduction of FLONA Jamanxim, decreasing the strictly-protected area in Novo Progresso by 30 percent and legalizing extensive landgrabs.

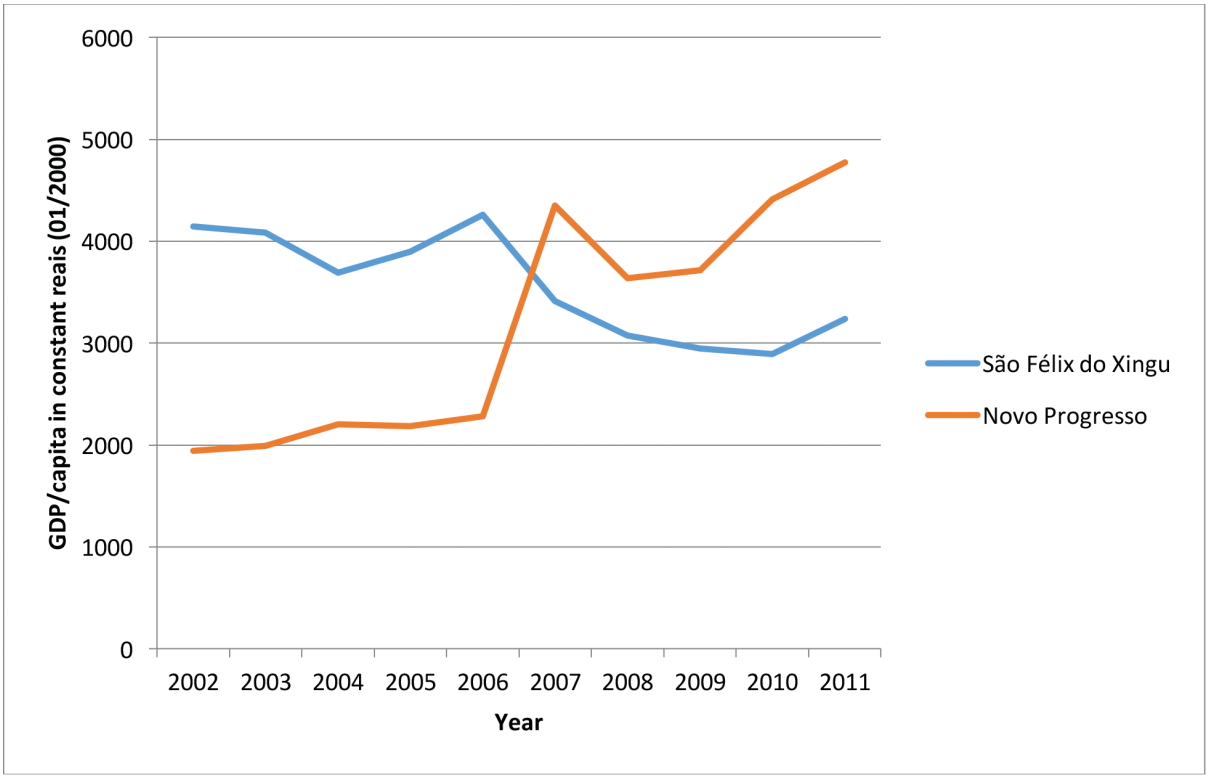
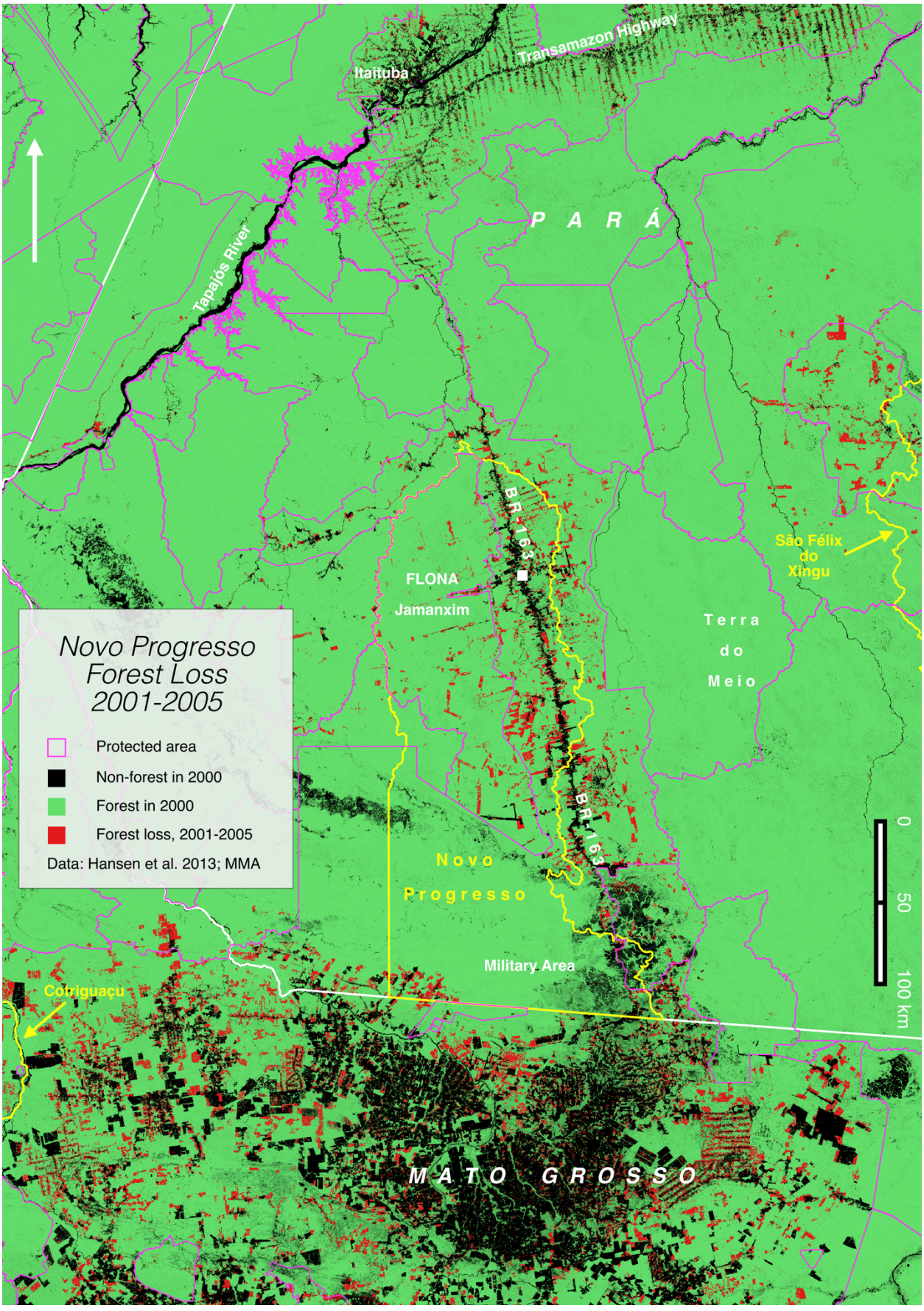


Figure 6.35: Real GDP per capita in São Félix and Novo Progresso. Current GDP per capita provided by Governo do Estado do Pará (2014a; 2014b) and adjusted to constant BRL using the Brazilian Consumer Price Index - IPCA (IBGE 2017c).

Figures 6.36-37: 6.36) Map of Novo Progresso showing forest loss in 2001-2005, during the peak of deforestation in the Brazilian Amazon; 6.37) Map of Novo Progresso showing forest loss in 2001-2014. The municipal seat is denoted by a white square. FLONA Jamanxim is shown with its original (pre-2016) boundaries. Encroachment in the FLONA is clearly visible.


Transamazon Highway
Itaituba
Tapajós River
PARÁ
BR-163
FLONA
Jamanxim
São Félix
do
Xingu
Terra
do
Meio
Novo
Progresso
Military Area
Cotriguaçu
MATO GROSSO
Novo Progresso
Forest Loss
2001-2005
Protected area
Non-forest in 2000
Forest in 2000
Forest loss, 2001-2005
Data: Hansen et al. 2013; MMA
0
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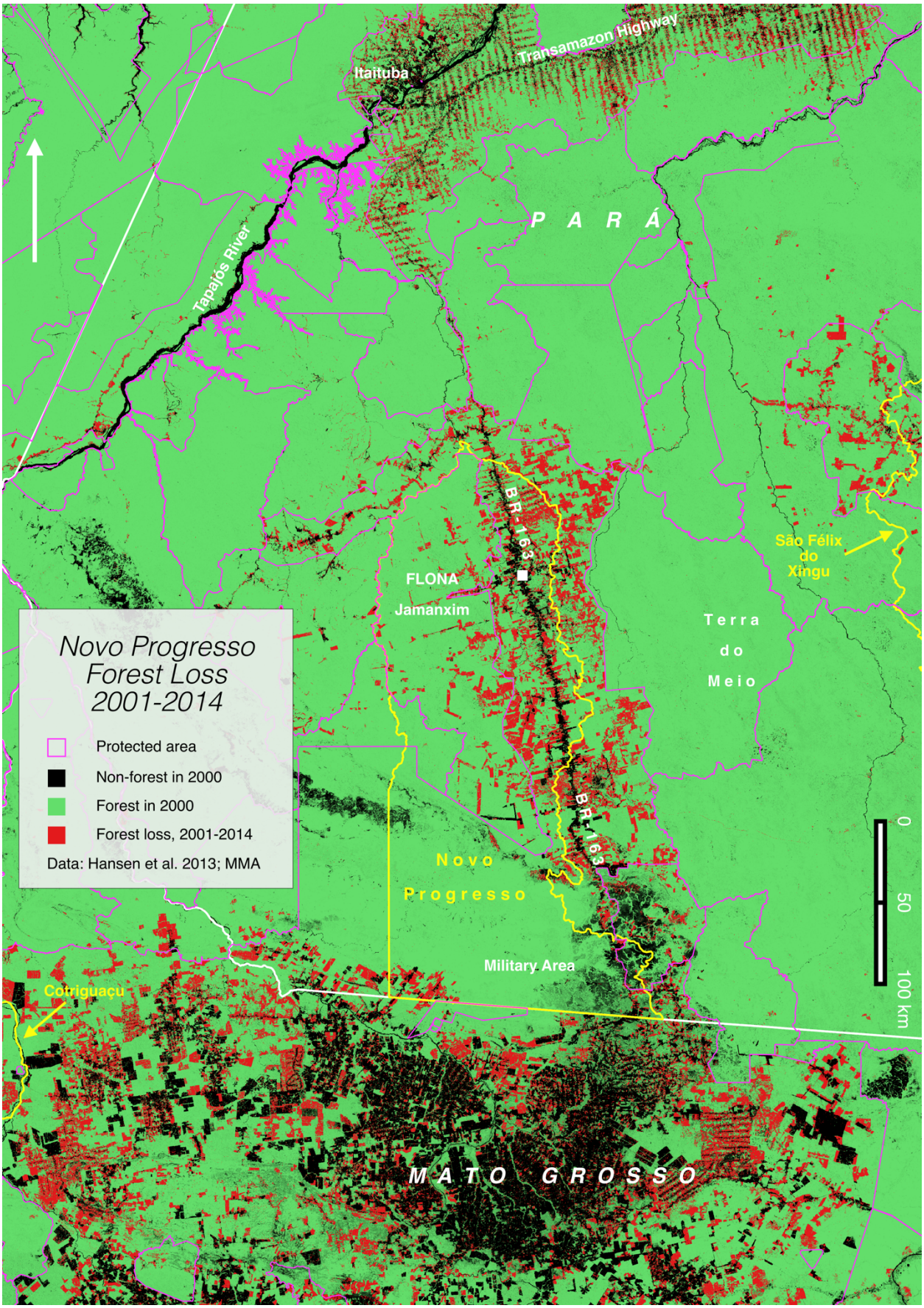
Novo Progresso
Forest Loss
2001-2014
Protected area
Non-forest in 2000
Forest in 2000
Forest loss, 2001-2014
Data: Hansen et al. 2013; MMA
Itaituba
Transamazon Highway
Tapajós River
PARÁ
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FLONA
Jamanxim
São Félix
do
Xingu
Terra
do
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Novo
Progresso
Military Area
Cotriguaçu
MATO GROSSO
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100 km

Comparative Analysis: São Félix and Novo Progresso

The differential effectiveness of land sparing coalitions in the two municipalities, resulting in effective constriction and stagnation in São Félix and ineffective constriction and extractive expansion in Novo Progresso, is explained primarily by differential investment in governance by external actors, coupled with frontier geography and the indirect effects of pasture-to-cropland intensification.

As the Amazonian municipality with the highest annual deforestation rate in the mid-2000s, São Félix was specially targeted for interventions by government and NGO actors hoping to set an example for the region. NGOs were attracted to São Félix by what a TNC employee called the "symbolic challenge" of the municipality known as the "deforestation champion" (TNC07 140402). Government agencies targeted São Félix for enforcement, and the Environment Ministry took the unprecedented step of implementing a project to support Forest Code compliance in the municipality. These heavily-invested external actors formed a strong land sparing coalition that attained cooperation from local actors to reduce deforestation. Novo Progresso, although still a priority municipality on the MMA list, received far less investment from external land sparing proponents.

At a proximate level, TNC staff attribute greater success in São Félix to stronger cooperation with the municipal government and ranchers' syndicate and difficulties in Novo Progresso to antagonism from the ranchers' syndicate and local political feuds, but these municipal political landscapes are structured by frontier geography and regional land use change dynamics. Territorial constriction in São Félix was facilitated by the regional geography of the frontier. The primary axis of economic development in eastern Pará is the north-south Belém-Brasília highway corridor, 250 km east of São Félix. Westward frontier expansion from São Félix advanced at ever-

increasing distances from highways and economic poles (Garcia, Soares-Filho, and Sawyer 2007), though with the prospect of connecting to BR-163 in Novo Progresso and the Transamazon Highway to the north. This spatial configuration of latitudinal penetration made it easier to 'close' the frontier with protected area 'barriers.'

In Novo Progresso, the north-south BR-163 that runs the length of the municipality constitutes the main axis of development in western Pará. The highway's bisection of the municipality increases access to remaining forest land in Novo Progresso, heightening the likelihood of deforestation (Laurance et al. 2001). As the artery connecting soy production in Mato Grosso with Amazonian ports, the BR-163 corridor has strong growth prospects driven by industrial agribusiness expansion and regional economic poles (Garcia, Soares-Filho, and Sawyer 2007). This frontier geography hinders efforts at territorial constriction, encouraging speculative land grabbing and leading to strong contestation of FLONA Jamanxim and local politics hostile to environmental governance interventions.

Distinct expansionary pressures and intensification dynamics in the two municipalities are also determined by the indirect effects of pasture-to-cropland conversions. First, expansion of soy on pastureland may displace ranchers to the forest frontier; second, intensification through cropland conversion raises land values, which drives land appreciation and speculation on forest margins. Richards et al. (2014) find that land appreciation effects of cropland expansion may explain as much as one-third of Amazonian deforestation. These indirect effects operate more strongly in Novo Progresso than in São Félix due to Novo Progresso's integration with land markets in soy expansion zones in Mato Grosso and Santarém. Land market effects and the advancing soy frontier may also be driving intensification by some large ranchers in Novo Progresso, whereas intensification in São Félix is induced by territorial constriction and positive

investments from NGOs. This contrast is reflected in economic growth in Novo Progresso tied to extractive expansion and regional agricultural development versus economic stagnation in São Félix tied to insufficient support for a productivist transition.

Part III: Discussion and Conclusion

Comparative Analysis: Mato Grosso and Pará

With the emergence of the land sparing complex in the Brazilian Amazon in the 2000s, deforestation declined dramatically in both Mato Grosso and Pará. The expanding soy frontier in Mato Grosso and the domination of state politics by agribusiness interests have facilitated the construction of state-level environmental governance mechanisms such as SLAPR and CAR due to the high legibility, concentration, and capitalization of the soy commodity chain. Major soy traders such as Cargill and Bunge were susceptible to international environmentalist pressures and coordinated with each other to impose the Soy Moratorium. Soy production is highly legible for purposes of monitoring and enforcement due to its fixed location and concentration on large properties, as well as due to the integration of soy producers with trading companies in markets for finance, inputs, and processing. Agricultural production in Mato Grosso continued to increase despite declining deforestation thanks to the high capitalization and profitability of industrial field agriculture, which expanded into pasture areas and drove intensification in ranching operations pressured by territorial constriction and rising location rents. While this pattern held across much of the eastern and central portions of the Amazon biome in Mato Grosso, the remote northwest region, where Cotriguaçu is located, has largely stagnated in the absence of intensive soy production or other productivist investment.

Pará has a much more heterogeneous frontier than Mato Grosso (Pacheco 2012), dominated by a mixture of logging, mining, and ranching, with the expansion of industrial soy production and

oil palm and tree plantations in some emerging productivist centers (Butler and Laurance 2009; R. T. Adams 2010; Baletti 2014; Piketty et al. 2015). The cattle commodity chain is more complex and less legible than the soy chain, as cattle are mobile and may pass through multiple properties from birth to slaughter, complicating efforts to eliminate deforestation from the cattle production chain. Many smallholders also participate in cattle ranching, multiplying the number of actors in the sector. Smallholders and large ranchers and loggers in Pará are locked in persistent land conflicts rooted in unclear land tenure and large-scale land grabbing, and these land conflicts help drive deforestation through contentious land change processes (Aldrich et al. 2012) and complicate forest governance efforts. Extractive coalitions remain strong in Pará, and murders of environmental and land rights activists are common. Luiz Araújo, who was the municipal Environment Secretary during the first years of TNC's project in São Félix, subsequently became Environment Secretary in the neighboring municipality of Altamira, a frontier of rapid deforestation, and was murdered by gunmen in front of his family in October 2016 (Sandy 2016).

These 'contested frontiers' in Pará have been more resistant to forest governance interventions, and deforestation in Pará has declined less rapidly than in Mato Grosso. Annual deforestation in Mato Grosso declined 94 percent from 2004 to 2012, while in Pará the decline was 80 percent, and since 2006, Pará has been the Amazonian state responsible for the largest area of annual deforestation. Agricultural intensification in Pará has also lagged, as territorial constriction has not been matched by large-scale investments in transforming productive practices. Government and NGO support for ranching intensification and smallholder diversification cannot match the capital leveraged by industrial row-crop commodity chains, but regions in Pará where these supply chains have become established have begun to emerge as new productivist centers,

with the municipality of Paragominas in northeastern Pará being the most prominent example (Piketty et al. 2015; C. Viana et al. 2016).

Despite these differences, deforestation rates in Mato Grosso and Pará are highly correlated (Pearson's $r = 0.86$) (Figure 6.38), indicating their strong dependence on macro-level economic and governance processes.

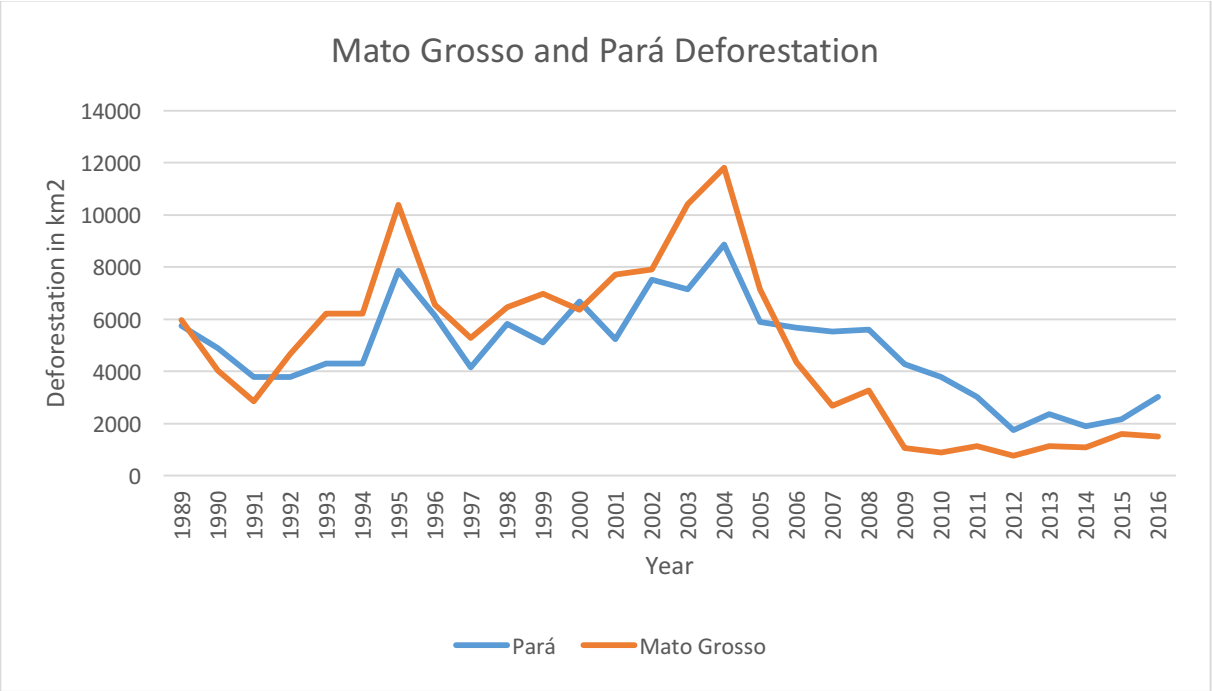


Figure 6.38: Annual deforestation in Mato Grosso and Pará, 1989-2016. Pearson's $r = 0.86$.

Land Sparing in the Amazon

Comparing these four municipalities across Mato Grosso and Pará States illuminates conditions for implementation of the Amazonian land sparing agenda. Territorial constriction is necessary but not sufficient for land sparing intensification. The effectiveness of constriction depends on how it is imposed and existing pressures in an area. Without constriction, deforestation may continue even as intensification occurs. With constriction, intensification should allow for increasing agricultural production over a constant area, but intensification is not the inevitable

outcome of land scarcity. With sufficient investments, a productivist transition can be engineered virtually anywhere, but because of the limited capital so far mobilized by the state and environmental NGOs, municipal-level productivist transitions in the Amazon have relied on investments by private actors. Intensification through private investment is occurring on some large properties in the ranching municipalities of Cotriguaçu, São Félix, and Novo Progresso, but more widespread intensification requires either arrival of the row-crop frontier, as in Nova Ubiratã and perhaps soon in Novo Progresso, or additional investments by land sparing coalitions. A key question for the future is thus whether the land sparing complex can effectively catalyze ranching intensification through constriction and positive incentives absent land pressure and investment from industrial row-cropping.

Even if intensification does not occur, command-and-control measures can substantially reduce extractive expansion. Punitive measures without corresponding incentives disadvantage smallholders, who have fewer resources to deal with fines or invest in intensification. As smallholders struggle, large landowners consolidate their holdings. In areas like Nova Ubiratã and São Félix, where it has been most successful, the land sparing project reduces deforestation and develops internal territorialization through territorial constriction, while support for a transition to more intensive, productivist agriculture comes either from investments by capitalized agro-industry, as in Nova Ubiratã, or in a weaker form from investments by government and NGO actors, as in São Félix. The social effects of land sparing policies are highly uneven, favoring agro-industry above smallholder livelihoods. The success of land sparing coalitions varies on the ground according to levels of investment by external actors, frontier geography, and regional dynamics of pasture-to-cropland conversion. In areas like Novo Progresso, where land sparing coalitions are weak (Table 6.2), or Cotriguaçu, which is very remote, an extractive economy still predominates.

Table 6.2: Selected actors in municipal-level land sparing coalitions.

	Selected Land Sparing Coalition Actors			
	Nova Ubiratã	**Cotriguaçu**	**São Félix**	**Novo Progresso**
State	Municipality, IBAMA	Municipality, IBAMA, Embrapa, Amazon Fund	Municipality, MMA, IBAMA, Embrapa	MMA, IBAMA, Embrapa
Agro-industrial capital	SPR	SPR, Vale	Frigol, Cargill, Walmart, Marfrig, Vale, SPR	Bunge, Vale
Environmental NGOs	TNC	TNC, ICV, ONF	TNC, IEB	TNC

Acronyms: Embrapa = Brazilian Agricultural Research Corporation; IBAMA = Brazilian Institute of the Environment and Natural Resources; ICV = Instituto Centro de Vida; IEB = Brazilian International Institute of Education; MMA = Ministry of Environment; ONF = French National Forests Office; SPR = Rural Producers' Syndicate; TNC = The Nature Conservancy.

These findings advance several strands of geographical literature on land use and governance. Regarding Amazonian deforestation, I respond to studies that identify policy drivers of deforestation reductions but lack a systemic theorization of how drivers interrelate (e.g., Assunção, Rocha, and Gandour 2012; Nepstad et al. 2014). These studies elide the interests motivating policy and the way policies interact to advance a political-economic agenda. Specifically, I identify the linkage between territorial constriction and agricultural intensification in the Amazon as the nexus on which policies and outcomes turn and through which interests are coordinated. Variation in the constriction-intensification relationship explains variation in municipal outcomes parsimoniously and dynamically.

Regarding the land sparing hypothesis, I expand on discussions of territorial governance, land sparing, and the Amazonian land use transition with an analytical framework that identifies the interests and processes driving a regional transition from an extractive regime to a productivist regime, and that exposes the collateral effects of this transition, including smallholder

dispossession. This analysis contributes more broadly to our understanding of when and how land sparing occurs, pointing to multilevel investment, frontier geography, and regional agricultural dynamics as determinants of constriction and intensification.

Conclusion

This chapter has examined the relationships between different actors in the land sparing complex in Brazil, the processes through which the land sparing agenda is promoted and contested, and the differential realization of environmentalist, corporate, and state governance objectives across different states and municipalities. Despite diverse land change and governance outcomes, the case studies affirm the centrality of the land sparing complex and productivist political-economic regimes at the national and regional levels to engineering reductions in deforestation in the Brazilian Amazon. The core of environmental governance to combat Amazonian deforestation comprises a project of territorialization and intensification aimed at shifting the Amazonian political-economic regime from extraction to productivism. This project inverts the territorializing and accumulative functions of environmental conservation under the protected areas model, instead employing a land sparing logic to engineer socio-economic development and state-building in the private property space outside protected areas.

The land sparing project is implemented by coalitions deriving from a multilevel complex of political-economic actors including government, NGOs, and corporations. Deforestation has declined almost 80 percent since 2004, but extractive coalitions continue to resist constriction, especially in the absence of sufficient support for intensification. Moreover, a successful productivist transition might lead the state to relax constriction, jeopardizing forest conservation. If deforestation pressures come from productivist industrial agriculture that increases state revenues, as opposed to predatory extraction that degrades natural capital, the state might open

new areas for conversion. This scenario seems likely given trends in reduction and reclassification of Brazilian protected areas (Bernard, Penna, and Araújo 2014), and would negate the land sparing effects of intensification.[69] Capture of Amazonian policy by an extractive complex under the Temer administration may also critically weaken the land sparing agenda.

Brazil's reduction of deforestation under the land sparing complex is promoted as a model for other countries. This chapter reveals the actors and interests invested in the Brazilian model, as well as the model's collateral effects, including economic stagnation where intensification lags, and the consolidation of large-scale landholdings at the expense of family agriculture. Amazonian forest governance is celebrated for 'decoupling' agriculture and deforestation, demonstrating the viability of land sparing for reconciling environmental conservation and capitalist development. This land sparing effect is a fallacy. Reductions in Amazonian deforestation do not automatically imply that global deforestation has been reduced or that Brazil's declining deforestation rate comprises "one of the main contributions across the world towards countering climate change," as BDNES proclaims (author field notes 151206). Rather, regional land sparing in the Brazilian Amazon has displaced deforestation to coupled frontiers elsewhere, and global tropical deforestation has accelerated. Chapter 7 explains how displacement negates land sparing, and Chapter 8 offers concluding reflections on forest governance and global development.

[69] This question of 'permanence' speaks to one of the three main criteria for the evaluation of forest conservation in REDD projects. For reductions in deforestation to be valid for REDD, they must have permanence, so that forest spared one year is not cut down the next; they must not be offset by displacement or 'leakage' of deforestation to other regions; and they must be 'additional,' in that they would not have happened absent the project intervention. I maintain that forest governance efforts in Brazil have resulted in 'additional' reductions in Amazonian deforestation, but these reductions are of doubtful permanence and are in any case offset by displacement.

CHAPTER 7

DISPLACEMENT

> "Soy has been displaced into the Cerrado. It's harder to control there, harder to market for conservation, and harder to determine what 'deforestation' means there. There is an unspoken conspiracy between the companies and the NGOs not to talk about the Cerrado."
>
> - *TNC staff member, 13 July 2015*

> "The queen of commodities breaks down borders, defies the limits of the environment, and surprises with outstanding numbers at every new harvest."
>
> - A Granja *Brazilian agricultural magazine soy issue, May 2015*

A heron swoops across a bank of trees, and tribal drums pulse. "The Amazon is one of our most important environmental assets," a voice intones. An eight-minute video produced by BNDES opens a session on Brazil's Amazon Fund at the Global Landscapes Forum, a two-day gathering on the sidelines of the Paris Climate Conference in December 2015. "Brazil is proud to have significantly reduced deforestation in its area of the Amazon," the voice continues. "This decrease is one of the main contributions across the world towards countering climate change."

From Paris to Jakarta, I have heard the gospel of Brazil's success in reducing deforestation. "In the [Brazilian] Amazon, reducing deforestation has already made a very large contribution to combating climate change – more than that of any other nation on Earth," affirms a report from the Union of Concerned Scientists titled "Deforestation Success Stories" (Boucher et al. 2014, 13). Meanwhile, in Indonesia, deforestation has accelerated dramatically over the course of the past decade. At a meeting in Jakarta in November 2014, Heru Prasetyo, the head of Indonesia's REDD agency, lamented, "When Brazil announces deforestation is 480,000 hectares, everyone applauds. When Indonesia announces deforestation is 450,000 hectares, no one applauds." Indonesia

exceeded Brazil in 2012 as the country with the highest annual rate of tropical primary forest loss (Margono et al. 2014), and Brazil's land sparing approach is now being promoted as a model for other tropical forest countries, including Indonesia. "Environmentalists are also transferring their experience in Brazil to Indonesia," writes Tollefson in *Nature*, although "Scepticism remains about whether these strategies will succeed in Indonesia, which is building a monitoring and enforcement programme from scratch. But [prominent Amazon forest scientist and REDD advocate Daniel] Nepstad points out that a decade ago, nobody would have believed Brazil was about to turn a corner. 'There are seeds of what we saw in Brazil ten years ago in Indonesia today,' Nepstad says" (Tollefson 2015, 23). This ecological modernization narrative suggests that Brazil has reconciled environment and development and the rest of the world can do the same. This narrative is flawed: Brazilian and Indonesian deforestation processes are connected, and reductions in Brazil's Amazonian deforestation do not translate directly into net reductions in global deforestation or global carbon emissions. The land sparing model of global forest governance is based on a fallacy.

The fallacy of socio-ecological modernization theories, including the land sparing hypothesis, is the idea that capitalist production occurs independently of extraction, and that productivist cores can grow without expanding the extractive periphery. The distinction between extraction and production describes fundamental flows of material and energy in the global economy, however. Historical processes of extraction in the Amazon fed the development of productivist centers like São Paulo, Rio de Janeiro, and the North Atlantic core. The growth of productivism in the Amazon under the land sparing complex, and the continued economic growth of the global economy, still depend on the extraction of material and energy, now being displaced to zones outside the Brazilian Amazon. While deforestation in the Brazilian Amazon has declined, not only has deforestation accelerated under the extractive regime in Indonesia, it has accelerated

in regions directly coupled to the Brazilian Amazon, including the Cerrado and the Amazonian countries outside of Brazil, often due to incursions by the same assemblages of actors and capital that previously drove Brazil's Amazonian deforestation. This displacement renders land sparing an illusion. While the global land sparing complex supports industrial expansion and state-building, it displaces deforestation, with all of its social and environmental costs, ultimately producing negative global socio-ecological outcomes.

In the previous chapters, I have shown how during the Great Acceleration since the end of World War II, tropical deforestation in Brazil and Indonesia has been organized under extractive political-economic regimes that build the wealth and complexity of productivist economies in core regions while driving social and ecological degradation in the Amazon and Indonesian Borneo. I have traced the evolution of ecological modernization discourse, which emerged in the 1970s and 1980s to frame a conciliation of capitalist development and environmental protection, and I have explored the rise of the land sparing hypothesis as a key corollary to the ecological modernization perspective and a foundation of The Nature Conservancy's tropical forest conservation programs. Chapter 5 explained why land sparing efforts have so far failed to reduce deforestation in Indonesia, which remains in the thrall of an extractive regime, and Chapter 6 demonstrated how, in a particular historical conjuncture, a land sparing complex emerged in Brazil to attempt to transform the political-economic regime in the Brazilian Amazon from extraction to productivism. The Brazilian land sparing complex has reduced Amazonian deforestation and engineered a partial and uneven productivist transition, but as I will explain in this chapter, reductions in deforestation and the growth of agro-industry in the Brazilian Amazon have displaced deforestation elsewhere. At the global level, the continued expansion and accumulation of productivist centers is integrally dependent on increasing degradation under the extractive regimes of the periphery. To wit,

although annual deforestation in the Brazilian Amazon declined by 1881 km^2 per year in 2000-2012, at the global level, annual tropical deforestation did not decline at all. Not only were reductions in Brazilian deforestation offset, but tropical deforestation globally *increased* by 2101 km^2 per year (Hansen et al. 2013). From a systemic perspective, the tropical deforestation crisis has grown dramatically worse, closely mirroring the accelerating degradation in other ecological indicators (Steffen et al. 2015). Land spared in Brazil has not been spared globally; deforestation has simply been displaced.

Land Use Displacement

Capitalist accumulation derives fundamentally from a combination of extraction (i.e., primitive accumulation, or accumulation by dispossession) and production (i.e., gains in productivity), a marriage that Jason Moore styles "productivity and plunder" (Moore 2010b; Moore 2011). The geographies of extraction and production are uneven and reproduced fractally at multiple levels, as production concentrates in industrialized cores that draw from extractive peripheries. The urban centers of São Félix do Xingu and Berau draw energy and material from their hinterlands, the Amazon and Borneo feed southern Brazil and Jakarta, Brazil and Indonesia fuel the growth of China, Japan, Europe, and the United States, and every productivist core has its own internal peripheries.

'Displacement' refers most broadly to a separation between consumption and production. With regard to deforestation, Meyfroidt and Lambin distinguish between 'policy-induced leakage,' which involves migration of agents of deforestation and substitution of domestic production with imports (e.g., of timber or animal feed) in response to environmental policies, and 'demand-driven displacement,' which refers to increasing consumption not met by domestic production, assuming policies remain constant (2009, 16139). This distinction is most relevant to an institutionalist

perspective that seeks to assess the independent effects of specific policy interventions. My exposition of the land sparing complex shows that changes in policy are intimately linked with changes in demand, since land sparing policy seeks to engineer economic transformation. From a systemic perspective, aggregate displacement and global outcomes are the primary concern, and Meyfroidt and Lambin have moved toward this more general perspective in subsequent work (Meyfroidt, Rudel, and Lambin 2010).

Capitalist production has a material throughput. Production requires inputs of materials and energy, which are extracted from the environment, meaning that every commodity has an ecological footprint (Wackernagel et al. 2002). The fundamental premise of ecological modernization is that the capitalist economy can grow without increasing its ecological footprint. This premise implies that the economy must dematerialize, achieving greater material efficiency but also ultimately decoupling growth from material throughput. In the history of capitalism, the exhaustion of extractive frontiers and their quotient of primitive accumulation has triggered the search for a 'spatial fix' and the construction of new frontiers of extraction to underpin continued growth and accumulation (Foster 1992; Harvey 2001; Moore 2010a). Capitalism has not before and is not now dematerializing; indeed, global material use has accelerated since the 1970s and especially since 2000, even as economic growth and population growth have slowed (Schandl et al. 2016). Ecological modernization in general, and the land sparing hypothesis in particular, rest on a fallacy of composition: they mistake the part for the whole, viewing local reductions in environmental degradation in 'developed' regions as proof of the possibility of a global green capitalism at the end of the 'time/development' axis. They fail to recognize that these improvements in some parts have occurred through the displacement of degradation to elsewhere in the whole.

There is a rich literature in geographical political economy and global political ecology that makes exactly this point. As Mansfield et al. (2010) elucidate in their critique of forest transition theory, modernization discourse views "economic development as a characteristic of places," while geographical scholarship views "economic development as occurring through dynamic relationships among places" (416). Contrary to forest transition and broader modernization perspectives that view capitalist development as an evolutionary process internal to a discrete region, and the North as a model for the South, they follow Doreen Massey in arguing that 'places' are specific, such as the Amazon or Borneo, but 'processes' are general, such as agricultural commodity production and global development. "Processes such as 'economic development' do not happen *in* pre-existing places," they write, "but instead happen across space (and time) and *produce* places, their environmental-economic opportunities and constraints, and their connected-yet-different trajectories" (Mansfield, Munroe, and McSweeney 2010, 424 original emphasis). Thus, the productivist core economy of Japan, where forest area has increased since World War II and biomass stock has nearly doubled (Kauppi et al. 2006), has a 'shadow ecology' of massive deforestation in Southeast Asia driven by Japanese timber imports (Dauvergne 1997). At the global level, Weinzettel et al. (2013) find that biomass use increases with affluence (i.e., growth is not dematerialized), 24 percent of the global land footprint is displaced through international trade, and there is a clear displacement of footprint from high income to low income countries. Jorgenson (2006) further illuminates this dynamic of unequal ecological exchange, showing that more-developed countries drive deforestation through trade relations with less-developed countries, and Lenzen et al. (2012) have found that the US, EU, and Japan drive biodiversity loss in the Global South, where 35 percent of threats to endangered species were linked to production for export.

Meyfroidt and Lambin (2009) examined Vietnam, a country that has undergone a 'forest transition' since 1992, and found that conservation policies and increased timber imports had slowed primary forest loss within Vietnam, but that reforestation in the country was primarily of exotic plantation monocultures, while a large proportion of log imports were for high-quality natural timber, often traded illegally, and were driving deforestation and degradation in the rest of Southeast Asia, including Indonesia. In an analysis of seven countries that have undergone forest transitions (France, Bhutan, China, India, Vietnam, Costa Rica, El Salvador, and Chile), Meyfroidt et al. (2010) found that net displacement in the agriculture and forestry sectors offset 22 percent of reforestation in those countries, but that displacement had increased in 2005-2010 to over 50 percent, further reducing the net contribution to global reforestation. Citing the examples of China and France, the authors recognize that "a rise in standards of personal consumption may be driving the decline in net environmental benefits from forest transitions" (20921). Indeed, beyond the fact that reforestation says nothing of forest quality, the crucial point here is that these forest transitions have for the most part emerged out of productivist modernization processes, and the ratio of displacement increases as forest transition countries 'develop' and increase their consumption.

These studies by Meyfroidt and Lambin (2009) and Meyfroidt et al. (2010), which are broadly representative of more institutionalist and econometric research on land use displacement, prompt several critical observations. The first relates to the question of deforestation versus reforestation. The authors note explicitly that forest cover is not an indicator of forest quality and that reforested areas under industrial tree plantations represent vastly different socio-ecological systems from old-growth natural forest. They also note that timber from primary deforestation often serves a different economic function from timber from tree plantations, the former used for higher quality construction or furniture manufacture and the latter for lower value plywood or

particle board production, for example. Consequently, deforestation and reforestation, as they are generally occurring in the contemporary global economy, represent distinct economic and socio-ecological moments. Deforestation is an extractive process that reaps windfall profits from appropriation of nature's 'free gifts,' while reforestation is a productivist industrial process that has a higher level of capitalization and lower profit rate. "There's lots of money for planting, but not for preserving even 100 ha," an official in the district government of Berau told me (BER10 150413), which makes sense when the money for planting comes from a levy on huge profits from deforestation. "Replanting is expensive and not efficient," an Indonesian logger explained, "We replant areas we no longer use. Reforestation is much more expensive than good forest planning" (BER17 150418), and by extension much less profitable than natural timber extraction. Displacement of deforestation is displacement of specific political-economic assemblages and specific forms of accumulation, and I argue that ecologically modernizing, productivist regimes are deeply connected with and dependent on extractive accumulation, which is a primary reason why local deforestation reductions are offset by displacement.

A second critical observation regarding the forest transition perspective and displacement calculations of the Meyfroidt articles relates to the country level of analysis. This 'territorial trap' (Agnew 1994) imposes a discrete accounting of national production and consumption that obscures the transnationality of political-economic processes. If low-input, extensive beef production for export to Russia is constrained in the Brazilian Amazon, displacement of extensive ranching to Paraguay for export to Russia may not register through Brazil's trade balance, because Brazil is not the source of the demand. From a systemic perspective, capitalism develops through the expansion of commodity frontiers, and if a frontier closes in one place but expands in another, and overall global consumption and land use change increase, then displacement is occurring and

reductions in local land use change are offset. It makes little sense to say that reforestation in Vietnam or Costa Rica has decreased global pressure on tropical forests when global tropical deforestation is rapidly increasing, just like it makes little sense to say that the preservation of Wehea or the expansion of industrial tree plantations has decreased pressure on forests in Borneo.

To combine these two points, I argue that displacement is not just about the production of commodities, it is about modes of accumulation and rates of profit. Extraction produces windfall profits that subsidize productivist accumulation. With the elimination of extraction, accumulation depends solely on increases in productivity (or asset-stripping and the redistribution and concentration of existing capital (cf. Kallis 2015)), which historically leads to declining rates of profit and the search for new frontiers to effect a spatial fix. Even productivity increases, for example through agricultural intensification, require increasing material throughput. Soy production in Mato Grosso is dependent on phosphate and potash extraction for phosphorus and potassium fertilizer, as well as fossil fuels for fertilizer production and mechanized farming and transport (Lathuillière et al. 2014; Roy et al. 2016). Meanwhile, van Noordwijk et al. (2017) have calculated that increased fertilizer applications for intensified oil palm production in Indonesia would not lower the net carbon footprint per unit product under current conditions.

Displacement of Amazonian Deforestation

The limitation of deforestation in the Brazilian Amazon has displaced both productivist and extractive expansion. Ranching intensification and industrial soy expansion in the Amazon draw investments from productivist centers (credit and subsidies from the government and commodity firms, as well as private capital reinvested by farmers and ranchers) and they profit from extractive processes of fossil fuel production and phosphate and potash mining (in the case of soy) and land grabbing and past deforestation (in the case of ranching). For land sparing to occur

from the shift to soy and intensified ranching, demand for soy and beef must be relatively inelastic and therefore diminished by increased production on limited land. In fact, rising global demand for beef has driven prices steadily higher since 2000, and soy is a 'flex crop' with especially elastic demand, thanks to soy consumption as both food (especially soybean oil), feed (soy meal for livestock), and fuel (biodiesel) (Borras et al. 2014; Oliveira and Schneider 2016). The limitation of soy expansion in Brazil's Amazon biome has thus displaced soy cultivation to other regions such as the eastern Cerrado and the Bolivian lowlands, where investments of capital accumulated through soy production in Mato Grosso are helping to drive large-scale deforestation. Extensive ranching and other extractive sectors such as logging and mining have also been displaced to new frontiers of primitive accumulation, such as southeastern Peru, maintaining the flow of extractive rents to productivist centers.

Scholars have previously investigated processes of 'indirect land use change' in Brazil, whereby agricultural intensification or expansion in one area may indirectly drive deforestation in another, whether through displacement of deforesting actors or market effects such as land speculation and the Jevons paradox. Until now, this dynamic has generally been studied in terms of the displacement of extensive land uses *into* the Amazon due to intensification and deforestation reductions elsewhere in Brazil. Several studies link agricultural intensification and forest recovery in the Atlantic Forest region to increasing Amazonian deforestation (Pfaff and Walker 2010; Walker 2012; Barretto et al. 2013). Industrial sugarcane and soy expansion in southern and Center West Brazil are also found to have driven Amazonian deforestation through displacement of individual ranchers (Andrade de Sá, di Falco, and Palmer 2013; Baletti 2014; Richards 2015) and regional land market effects where cropland conversion drives land appreciation and speculation on forest margins (Arima et al. 2011; Richards, Walker, and Arima 2014). Richards et al. (2014)

estimate this latter effect may be responsible for as much as one-third of Amazonian deforestation. With territorial constriction under the land sparing complex in the Amazon and agricultural intensification occurring in parts of the region, deforestation is now being displaced from the Amazon to other parts of Brazil and abroad. This displacement involves both deforestation by extractive land uses, such as logging and extensive ranching, and deforestation by intensive soy agriculture, which previously expanded through land conversion in the Amazon and now is developing on new frontiers in the Cerrado, the Bolivian lowlands, and the Atlantic Forest of Paraguay.

A word is needed at this point on the relative ecological values of different forest ecosystems. Some might argue that the tropical humid forests of the Amazon are a uniquely special ecosystem, and that the protection of this 'sacred grove' is worth the conversion of 'sacrifice zones' (Oliveira and Hecht 2016) such as the more open, dry forests and savannas of the Cerrado or the Gran Chaco. There is no one clear hierarchy that captures all the variables of potential interest to definitively mark one forest as more worthy of conservation than another. Both the Amazon and Cerrado are home to populations of indigenous and traditional peoples. The Amazon forest is more biodiverse and carbon dense than the Cerrado, but Cerrado ecosystems are still quite carbon dense, extremely biodiverse with high levels of endemism, and highly threatened, with very little protected area and over 50 percent of the original biome already converted (MMA/IBAMA 2009; WWF 2011). In the Brazilian Amazon, by comparison, over 50 percent of remaining forests are protected and nearly 80 percent of the original forest area remains intact (Soares-Filho et al. 2010). Annual deforestation rates and carbon emissions from the Cerrado now exceed in some years the deforestation and emissions rates from the Amazon (MMA/IBAMA 2009; MMA/IBAMA 2015).

The environmentalist predilection for protecting the Amazon over the Cerrado emerges from a 'high forest bias' (Hecht 2005) that is grounded less in scientific criteria than in the fetishization of tropical rainforest as an exotic Eden within the Western colonial worldview (Merchant 1995; Grove 1995) and in state concerns with the territorialization of remote regions.[70] Furthermore, not all deforestation from the Brazilian Amazon is displaced to less biodiverse or carbon dense regions. The forests of the western rim of the Amazon Basin in Ecuador and Peru, where deforestation has also accelerated, are generally more biodiverse than the forests of the eastern Amazon in Brazil's arc of deforestation (Bass et al. 2010). In short, if reductions in deforestation in the Amazon biome do not result in net reductions in tropical deforestation, the displacement of deforestation is not readily redeemed by arguments justifying the preservation of the Brazilian Amazon at the expense of other tropical forest ecosystems. Such an exercise, in any event, would depend on a Pyrrhic or cynical reason that is complacent toward global socio-ecological degradation.

In the following sections, I trace the displacement of deforestation from the Brazilian Amazon. I move from the centers outwards, so to speak. First, I examine the displacement of intensive soy production to the Brazilian Cerrado, Bolivian Chiquitano, and Paraguayan Atlantic Forest. Second, I examine the displacement of extractive frontiers to the extra-Brazilian Amazon and the Gran Chaco of Bolivia and Paraguay, which are driven both by the closing of the Brazilian Amazon frontier and the expansion of intensive land uses on displaced soy frontiers.

Displaced Productivism: Soy and Deforestation in Brazil, Bolivia, and Paraguay

[70] As another indication of the extent of this bias, when The Nature Conservancy's Latin America Region conducted eco-regional analysis to set its conservation priorities in the mid-2000s, it realized that while there was substantial conservation activity in the Amazon, the temperate grasslands of Patagonia were virtually unprotected. This finding led TNC to establish a Patagonia Grasslands Conservation Program in 2008 (TNC49 150811).

During the 1980s and 1990s, soy cultivation expanded rapidly in the Cerrado of the Brazilian Center West region, which comprises the states of Mato Grosso, Mato Grosso do Sul, and Goiás. Beginning in 2000, soy began to expand into the Amazon biome in Mato Grosso, and in addition to driving indirect land use change by displacing ranching activities, soy expansion contributed directly to deforestation through the conversion of forests for cropland. In 2001-2005, 26 percent of cropland expansion in Mato Grosso's Amazon biome came at the expense of forest (Macedo et al. 2012), and deforestation for large-scale field agriculture accounted for 17 percent of total large-scale forest clearing in Mato Grosso in 2001-2004 (Morton et al. 2006). During this period, deforestation for cropland was directly correlated with soybean prices (Morton et al. 2006). In the early 2000s, forest-to-cropland conversion thus emerged as a major driver of deforestation in the southern Amazon, totaling over 5400 km^2 in 2001-2004 and comprising fully 23 percent of large-scale deforestation in 2003 (Morton et al. 2006).

After 2004, new governance measures under PPCDAm and the Soy Moratorium and declining soy prices virtually eliminated direct deforestation for soy in the Amazon biome. When commodity prices rose and soy area again began to expand after 2007, new cropland in the Amazon was established almost entirely over previously cleared pasture areas (Macedo et al. 2012). As of 2016, just 372 km^2 of land deforested in the Amazon biome since 2008 was planted in soy, representing 1 percent of the soy acreage in the biome and less than 1 percent of total Amazonian deforestation since 2008 (GTS Soybean Working Group 2016). While soy has continued to expand over pasture areas in the Amazon, the terms of the Soy Moratorium have limited soy expansion to areas deforested prior to 2008.[71] This constriction of land availability in the Amazon region has

[71] Originally, the Moratorium applied to all areas deforested after July 2006, but with the passage of the 2012 Forest Code, which amnestied most illegal deforestation that had taken place before 2008, the Moratorium requirements were altered to apply to areas deforested after July 2008 (GTS Soybean Working Group 2016).

helped drive large-scale deforestation for soy expansion in the eastern Cerrado, especially on the new soy frontier of Matopiba, located between the states of Maranhão, Tocantins, Piauí, and Bahia (Figure 7.1).

Harris et al. (2017), in their analysis of emerging hot spots of forest loss, detect a clear shift in 2000-2014 in the geography of Brazilian deforestation, with diminishing forest loss in Mato Grosso and Rondônia and new and intensifying deforestation hotspots in Matopiba. In 2007-2013, conversion of natural vegetation accounted for 11 to 23 percent of soy expansion in the Cerrado, and 40 percent of soy expansion in Matopiba (Gibbs et al. 2015). Cerrado vegetation is a mixture of woodland and savanna, but Gibbs et al. report that 65 percent of native Cerrado vegetation and 81 percent of remaining natural vegetation in Matopiba match the Brazilian Government's definition of forest (Gibbs et al. 2015, S4).[72] In 2008-2015, as deforestation in the Amazon declined, 23,829 km^2 were deforested in Matopiba, representing 63 percent of total Cerrado deforestation during this period (LAPIG 2017), and the area planted to soy expanded by thousands of square kilometers per year (Figure 7.1). The constriction of the soy frontier in the Amazon is directly linked to the expansion of the soy frontier in Matopiba through the displacement of actors and capital. Gustavo Oliveira, who has conducted detailed fieldwork on the Brazilian soy sector, reports that agribusiness managers and soy farmers assert that "their expansion plans are not curtailed by intensification of production [e.g., in Mato Grosso], but rather conditioned by favorable institutional settings for the 'development' of 'new' lands in less regulated areas like the northeastern edge of the Cerrado in Brazil [i.e., Matopiba]… where profits from intensified production are often reinvested" (Oliveira and Hecht 2016, 270; Oliveira 2013). This geography

[72] The Brazilian Government follows the FAO definition of forest as an area of greater than 0.5 ha with trees greater than 5 m in height and canopy cover of more than 10 percent (Serviço Florestal Brasileiro 2010).

of soy production is understood explicitly by multi-national farm management companies and migrant soy farmers (Oliveira and Hecht 2016), as well as by environmental activists and the Brazilian government. Embrapa describes Matopiba as "the last Brazilian agricultural frontier" (Embrapa 2017), and the TNC employee quoted in the epigraph confesses to an "unspoken conspiracy" between soy agribusiness and environmental NGOs to ignore the displacement of soy-driven deforestation to the Cerrado (TNC43 150713).

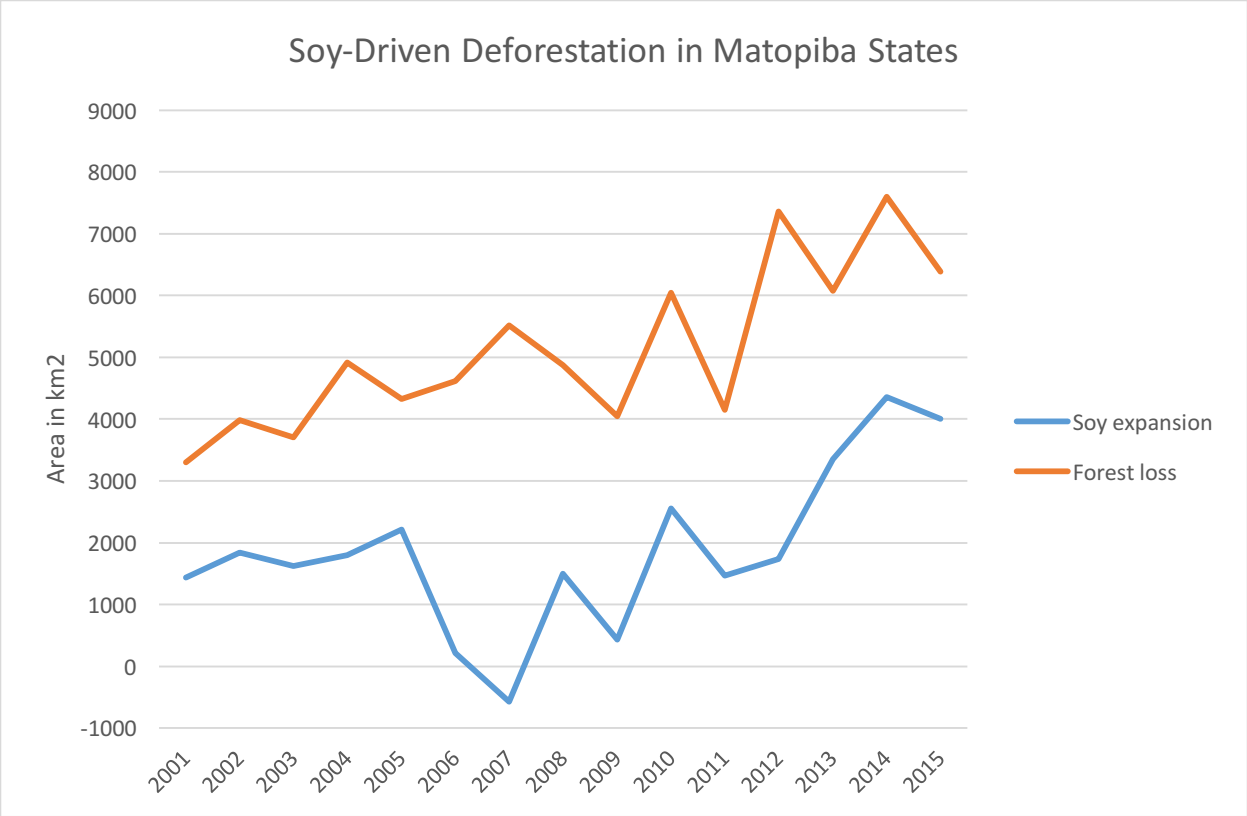
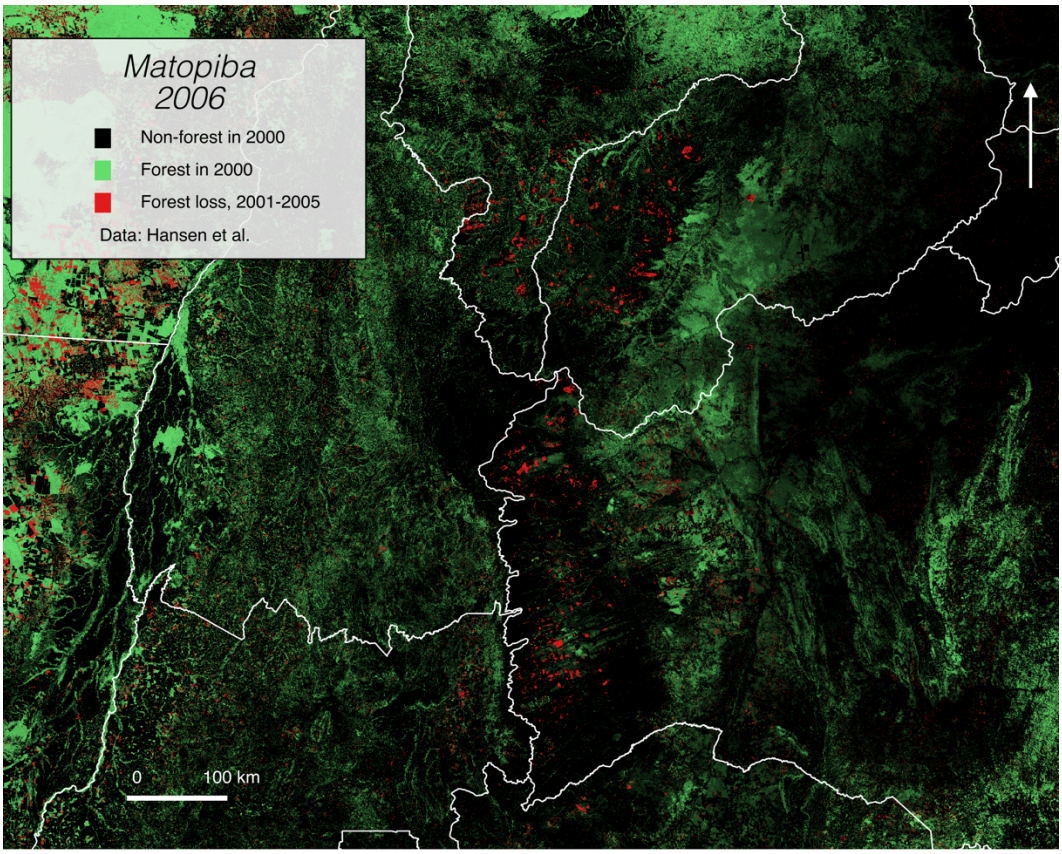
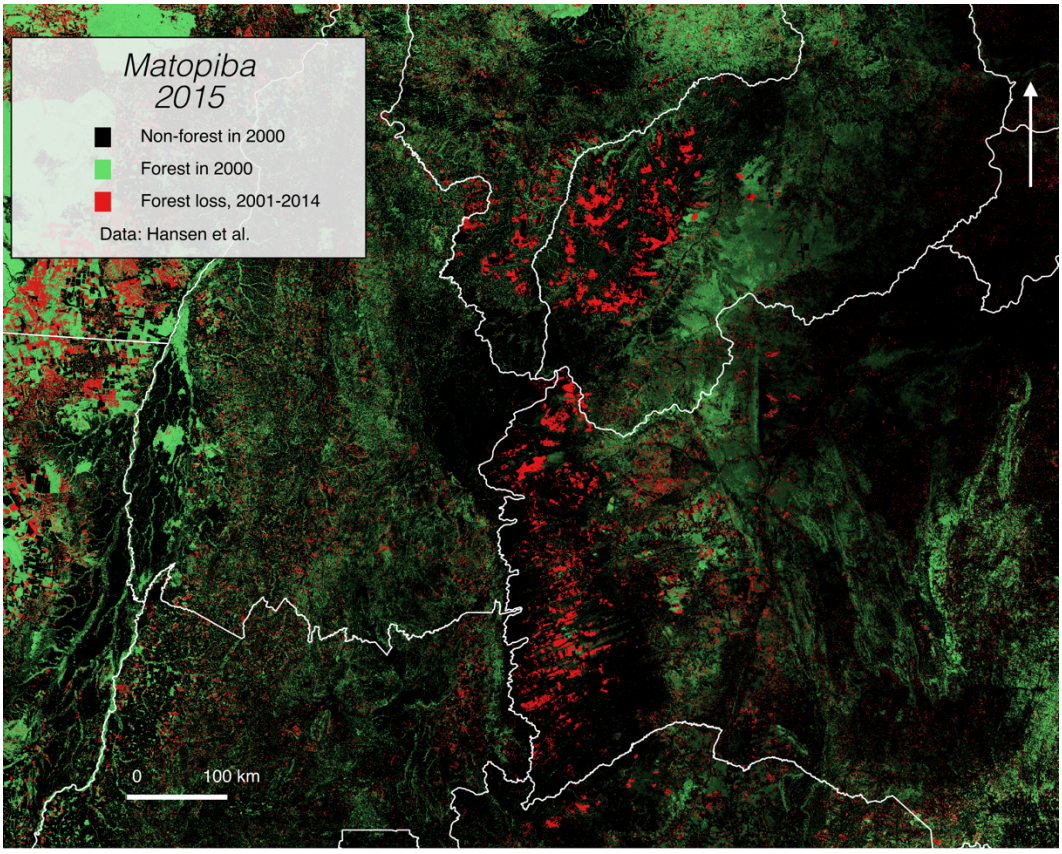


Figure 7.1: Soy-Driven Deforestation in the Matopiba States of Maranhão, Tocantins, Piauí, and Bahia. Forest loss is annual forest loss at >30 percent canopy density as detected by Global Forest Watch (Hansen et al. 2013). Soy expansion is the increment in soy planted area relative to the previous year (IBGE 2016d). These figures indicate expanding soy area correlated with increasing forest loss after 2007 in the Matopiba states. The analysis combines the total area of the four states, which is larger than the Cerrado zone of Matopiba proper, but illustrates coupled soy expansion and deforestation driven in part by displacement from the Amazon, where deforestation declined sharply after 2007.


Matopiba
2006
Non-forest in 2000
Forest in 2000
Forest loss, 2001-2005
Data: Hansen et al.
0
100 km


Matopiba
2015
Non-forest in 2000
Forest in 2000
Forest loss, 2001-2014
Data: Hansen et al.
0
100 km

Figures 7.2-3: 7.2) Matopiba in 2006, showing forest loss in 2001-2005; 7.3) Matopiba in 2015, showing forest loss in 2001-2014, demonstrating large-scale deforestation after 2005. Data from Hansen et al. (2013). Forest cover is shown on a continuum between black (non-forest) and bright green (100 percent canopy density), meaning that less intense green coloration still denotes woodlands, albeit with less dense canopy cover.

Soy and Ranching Frontiers in Bolivia and Paraguay

The Cerrado is not the only biome to absorb soy expansion displaced from the Brazilian Amazon. Since the 1990s, Brazilians have played a prominent role in the growth of soy agribusiness in Santa Cruz Department, in the eastern Bolivian lowlands across the border from Mato Grosso and Mato Grosso do Sul (Mackey 2011). While the soy frontier in Santa Cruz was configured prior to the closing of the frontier in the Brazilian Amazon, the period since 2005 appears to comprise a new phase in agricultural expansion in the Bolivian lowlands, which comprise Chaco woodland savanna, Chiquitano dry forest, and Amazonian humid forestlands. Genetically-modified soybeans were legalized in Bolivia in 2005 and mechanized, high-input production became "ubiquitous" (McKay and Colque 2016). Müller et al. (2010) find that soy expansion into the Bolivian Amazon biome only began after 2000. Urioste (2012), meanwhile, detects a new wave of Brazilian investment after 2005, not of soy farmers but rather of ranchers (see also Graesser et al. 2015). The influx of ranchers makes sense given the growing scarcity of ranchland in Brazil after 2005 due to environmental regulations in the Amazon and soy expansion on former pasturelands, while Bolivia is still considered a frontier of cheap land and lax environmental regulation (Redo, Millington, and Hindery 2011; Urioste 2012).

As in Brazil, soy and ranching develop as coupled intensive and extensive frontiers in Bolivia. Ranching has grown as a direct driver of deforestation in the Bolivian lowlands, including in the Amazon biome, and has expanded even over protected areas, with investments by Brazilians especially in border regions (Müller et al. 2012; Müller et al. 2013). Estimates of deforestation

rates in eastern Bolivia vary, due in part to varying forest definitions and the lack of a consistent monitoring program. Nonetheless, it seems clear that deforestation in Bolivia has accelerated concurrently with reductions of deforestation in the Brazilian Amazon. Redo et al. (2011) report rising deforestation in Santa Cruz, with particularly rapid clearing after 2005 driven in part by farming and ranching expansion by Brazilians. National-level deforestation estimates report steady or increased deforestation rates since 2005 (FAN-Bolivia 2012; Hansen et al. 2013; Tabuchi, Rigby, and White 2017). In particular, 2010 marked a major spike as land clearing combined with El Niño drought conditions to ignite massive wildfires, and Bolivia lost over 4500 km^2 of forest cover (Hansen et al. 2013). Deforestation rates in 2008 and 2011-2012 have also been especially high (Hansen et al. 2013), corresponding with global soybean price spikes and suggesting that as deforestation in the Brazilian Amazon has decoupled from soy prices, deforestation in Bolivia has become more closely coupled to them.

Bolivia has continued to provide an outlet for accumulation by Brazilian agro-industrial capital, which has helped to drive increasing deforestation in the Bolivian lowlands. Urioste (2012) reports that most profits realized by Brazilians in the soy and ranching sectors are repatriated to Brazil, and that most Brazilian farmers and ranchers with properties in Bolivia continue to own lands and agribusiness interests in Mato Grosso and Mato Grosso do Sul. The expanding frontier in Bolivia profits not just individual Brazilian farmers and ranchers, but also Brazilian companies and government interests. Petrobras, the Brazilian parastatal oil company, has signed a $1.2 billion partnership with the Bolivian state oil company to develop gas fields in the Chaco (Stauffer 2016). BNDES has also been a major financier of Brazilian economic expansion throughout Latin America, typically financing infrastructure projects contracted to Brazilian construction companies such as Odebrecht and Andrade Gutierrez. BNDES financing to Brazilian projects in

Latin America and the Caribbean grew 1082 percent from 2001 to 2010. In Bolivia, the bank was involved in 2008-2011 in a controversial $415 million project awarded to the Brazilian construction company OAS for construction of a road that would have passed through an indigenous reserve, although BNDES eventually withdrew financing in the face of protests and accusations of corruption (Maisonnave 2009; BRIO Watchdog 2015). In short, even as Brazil has constrained Amazonian deforestation, Brazilian capital has been actively pursuing profits on new frontiers in Bolivia, driving increasing deforestation in the tropical forests of the eastern lowlands.

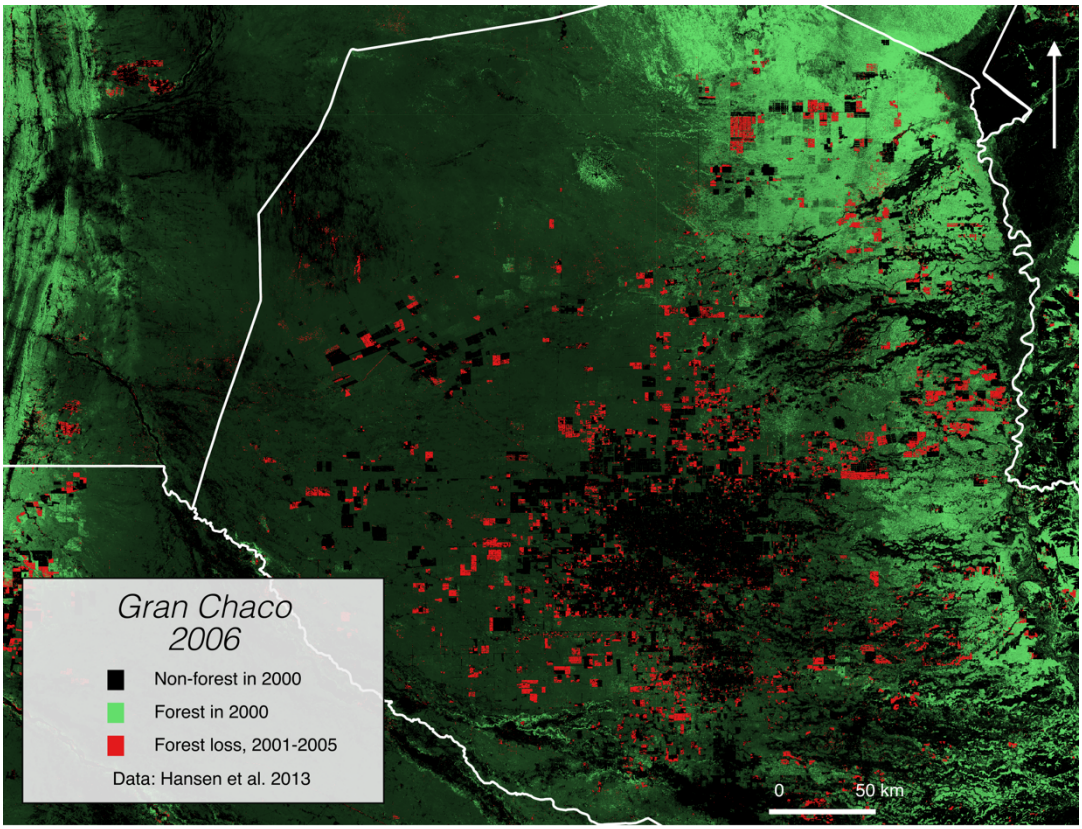
Paraguay presents a broadly similar picture of Brazilian capital driving deforestation on expanding soy and ranching frontiers, though specific actors and biomes are somewhat different. During the 1970s, mechanized soy farming pushed small and medium-scale farmers out of southern Brazil towards the Cerrado of the Center West. Many displaced Brazilian farmers also migrated to the Atlantic Forest region of eastern Paraguay, driving rapid deforestation and agricultural expansion in the region. By the early 1980s, there were over 300,000 Brazilians living in eastern Paraguay (Richards 2011), where they helped consolidate an export-oriented industrial soy economy. During the 1990s, Paraguay lost over 25,000 km^2 of forest cover and the area planted to soy more than doubled, reaching 13,500 km^2 in 2001 (Huang et al. 2009; Richards 2011). During the 2000s, the area under soy more than doubled again, reaching 28,000 km^2 in 2010 (Elgert 2016). The expansion of soy cultivation in eastern Paraguay has been driven by Brazilian immigrants and closely linked to the soy complex across the Brazilian border in Paraná and Mato Grosso do Sul. Raw soybeans grown in Paraguay are often exported to Brazil for crushing and shipping (Elgert 2016), and the Brazilian Government provides technical support for Brazilian agribusiness land deals and production systems in Paraguay (Galeano 2012).

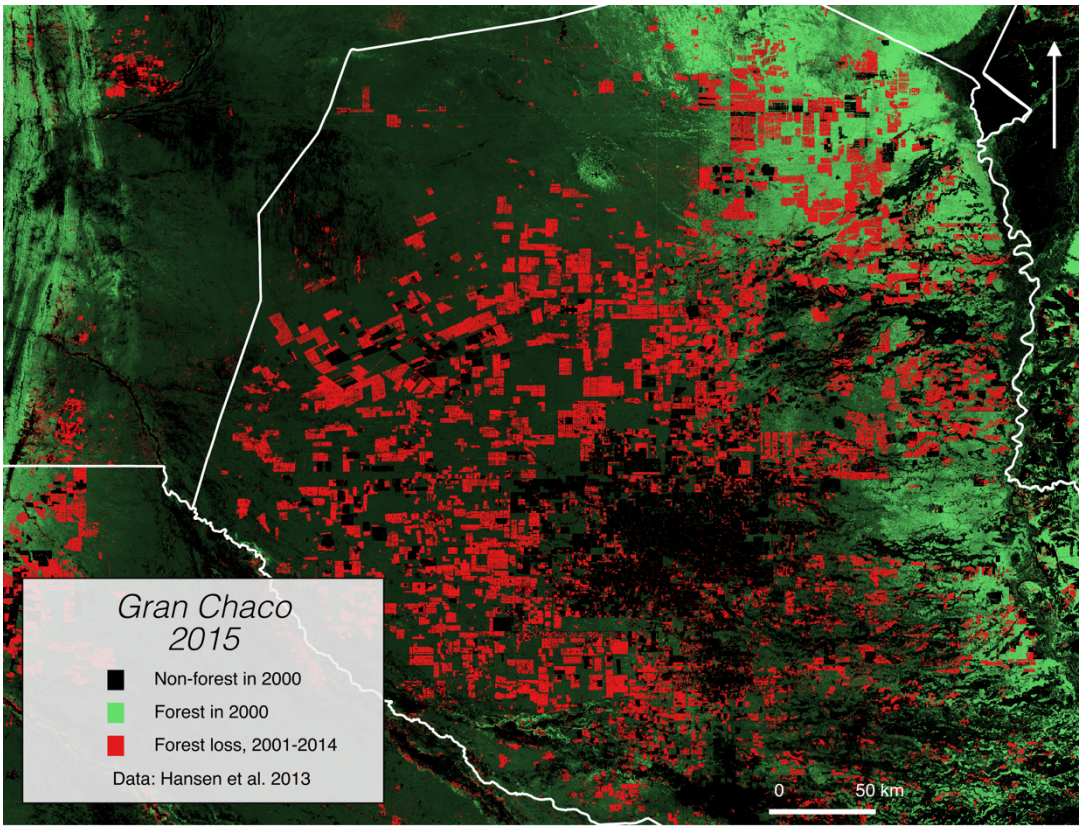
As in Brazil and Bolivia, the expansion of intensive soy production in eastern Paraguay has displaced extensive ranching activities, opening up new extractive frontiers. In this case, the expansion of soy in the Atlantic Forest region has displaced ranching to the Chaco biome in western Paraguay, which has attracted ranching investments from Paraguay and abroad thanks to its cheap land and loose environmental regulations and enforcement (le Polain de Waroux et al. 2016). In response to the rapid deforestation in the Atlantic Forest region in the 1990s and early 2000s, WWF successfully lobbied the Paraguayan Government to pass a 'Zero Deforestation Law' in 2004 that prohibited new forest clearing in the eastern region of the country (Elgert 2016), although by this time over 80 percent of the Atlantic Forest had been lost. As in the Brazilian Amazon, this constriction of deforestation in the Atlantic Forest region limited soy expansion to the conversion of existing pastures, and displaced ranching to a new frontier of deforestation (Baumann et al. 2016, 223). Deforestation in the Chaco, which is dominated by open woodland and thorn forest vegetation, has accelerated since 2005, with an increasing number of large-scale clearings indicating the growing presence of a globalized, industrial cattle commodity chain (Caldas et al. 2015; le Polain de Waroux et al. 2016). Brazilian immigrants to the Chaco are far less numerous than to eastern Paraguay – Caldas et al. (2015) quote a figure of 1659 Brazilians in the region in the late 2000s – but Brazilian ranchers in the region are generally investing in large land areas, and like Brazilian soy farmers, they often export through Brazil and benefit from the technical assistance and political support of the Brazilian Government (Galeano 2012).

As the Brazilian Amazon frontier has closed, the frontier in the Paraguayan Chaco has opened. At the national level in Paraguay, deforestation rose from an average 2150 km^2/year in 2001-2004 to an average 3564 km^2/year in 2005-2015, an increase of 66 percent, while Brazil's Amazonian deforestation during this period was almost exactly inverse, declining 61 percent. In

2012, the low point of deforestation in the Brazilian Amazon was the high point of deforestation in Paraguay. That year, 5102 km^2 of forest was lost in Paraguay (Hansen et al. 2013), while primary deforestation in the Brazilian Amazon totaled 4571 km^2. Paraguay's forest loss in 2012 thus exceeded deforestation in the Brazilian Amazon, despite Paraguay having an area less than one-tenth that of Brazil's Amazon biome.

Figures 7.4-5: 7.4) Gran Chaco in 2006, showing forest loss in 2001-2005; 7.5) Gran Chaco in 2015, showing forest loss in 2001-2014, demonstrating massive deforestation after 2005. Rectangular clearings are typical of large-scale deforestation for cattle pasture. Forest cover is shown on a continuum between black (non-forest) and bright green (100 percent canopy density), meaning that green coloration in the central and western Chaco still denotes woodlands, albeit with less dense canopy cover than in eastern areas near the Paraguay River.


Gran Chaco
2006
Non-forest in 2000
Forest in 2000
Forest loss, 2001-2005
Data: Hansen et al. 2013
0
50 km


Gran Chaco
2015
Non-forest in 2000
Forest in 2000
Forest loss, 2001-2014
Data: Hansen et al. 2013
0
50 km

Displaced Productivism versus 'New Extractivism'

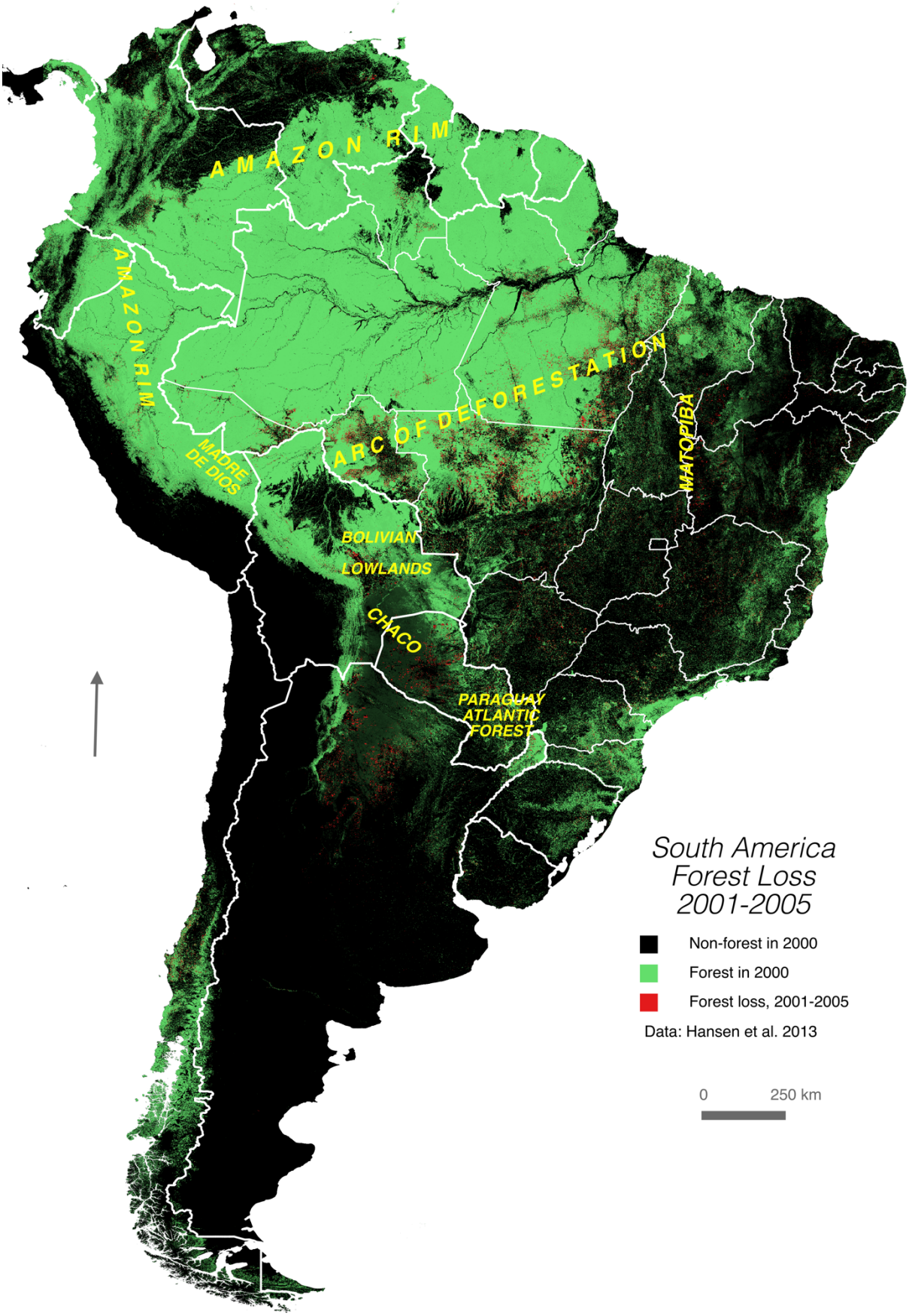
The limitation of soy expansion in the Brazilian Amazon has not limited the overall expansion of soy in South America, and the displacement of Brazilian agribusiness from the Amazon region is driving rapid deforestation in the eastern Cerrado and the Chaco, Chiquitano, and Amazon biomes of Paraguay and Bolivia. I have characterized the growth of new soy frontiers as displaced productivism, which in most areas results in a cascade displacing extensive ranching to a new extractive frontier. Critics of agro-industrial expansion in South America might take issue with my characterization of mechanized soy production as a productivist economy, because they argue that export-oriented agribusiness amounts to a 'new extractivism' (in the sense of a mining of natural resource wealth) that does not contribute to articulated socio-economic development (Gudynas 2009; Baletti 2014; see also Chapter 3). I share these critics' opposition to the social and ecological repercussions of industrial soy production, but I hold nonetheless that intensive soy, with its high level of capitalization, mechanization, and infrastructure requirements, is generally situated within a productivist economy that promotes reinvestment, vertical integration, and agglomeration, which are the hallmarks of capitalist modernization. The degree to which vertical integration and articulated development are achieved, of course, may depend on the facilitation of productivist political structures as well as economic and environmental conditions (Garrett, Lambin, and Naylor 2013b).

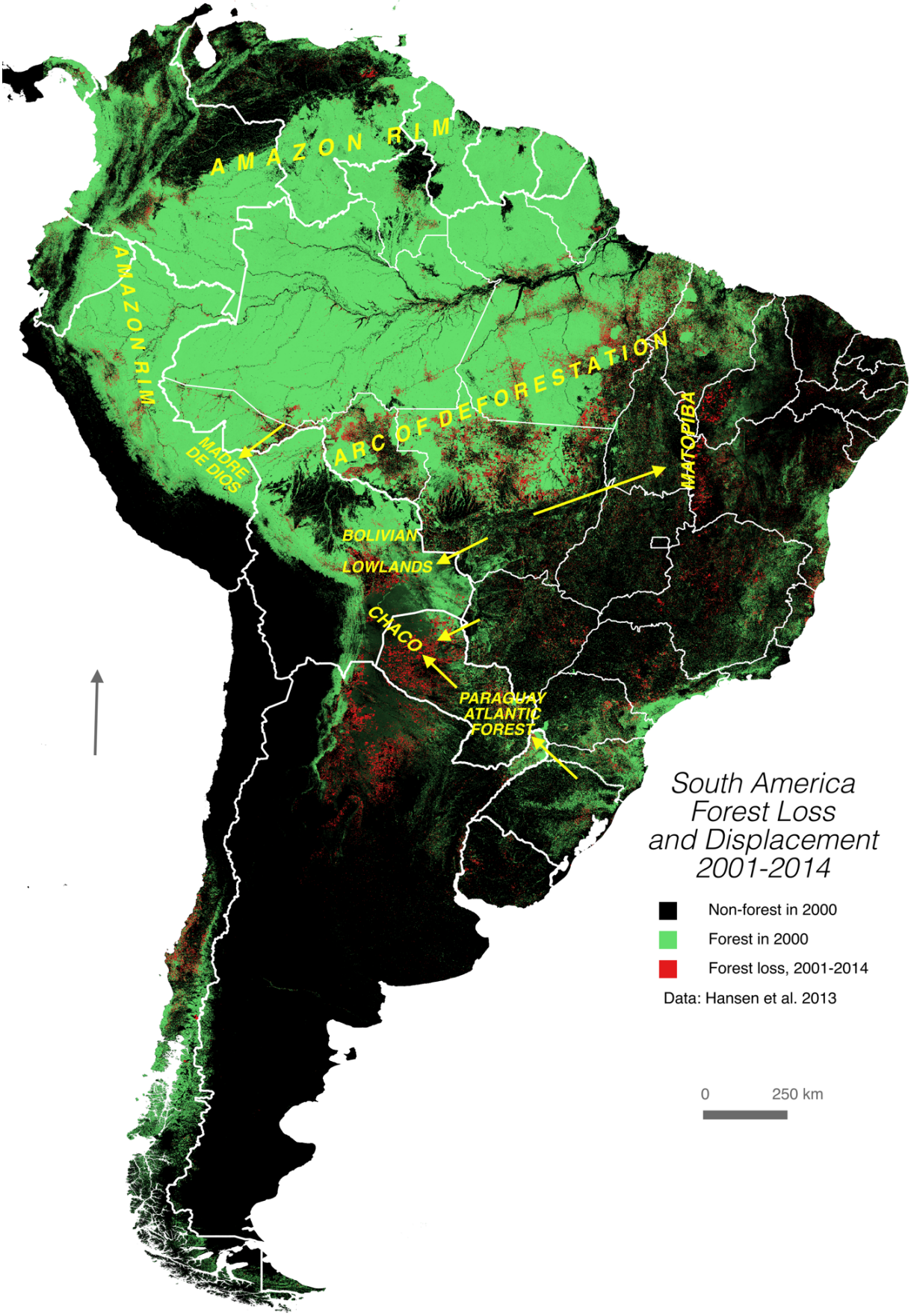
Brazilian soy producers in Santa Cruz may repatriate most of their profits and limit reinvestments (Urioste 2012), and value added to soybeans grown by Brazilian producers in Paraguay may be captured by processors and traders in Brazil (Elgert 2016), but these are typical characteristics of the geography of global commodity chains. The critical distinction between extraction and productivism is that extraction draws down an available resource base until it is

exhausted and then moves on, creating a boom and bust pattern and profiting from primitive accumulation, while productivism invests resources in order to produce a continuous and ideally a growing surplus through 'productive' accumulation. In the real world, there are shades of gray between these two moments of capitalist accumulation. Urioste (2012, 444) alleges, for example, that soy production in Bolivia is primarily geared toward the realization of short-term profits and drives environmental degradation that may lead to the abandonment of soy fields to cattle pasture, which would give a more extractive character to the sector. A similar critique is levied against virtually all industrial agriculture, however, and reflects the point that intensive production is realized through a concentration of inputs from elsewhere, as well as from the ground beneath.

Unlike the extensive ranching that it often displaces, industrial soy is integrated within productivist economies and represented discursively as a key assemblage of intensive, eco-modernist agriculture (Oliveira and Hecht 2016). "Many of today's large-scale producers in the Chaco and Chiquitano are highly educated, live in cities, travel internationally, and keep track of politics, taxes, and the Chicago mercantile exchange," write Waroux and colleagues, "Most of them manage production remotely, and some, empowered by the soy boom, own large transnational companies that, after expanding into neighboring provinces and countries, are looking toward Angola or Mozambique" (le Polain de Waroux et al. 2016, 4023). The concentration of agricultural production in highly-capitalized, intensive, transnational commodity chains is the apotheosis of capitalist modernization, and in this sense, the expansion of soy in the Cerrado, Bolivia, and Paraguay comprises displaced productivism.

Figures 7.6-7: 7.6) Map of South America showing forest loss in 2001-2005; 7.7) Map of South America showing forest loss in 2001-2014 and displacement from the Brazil's Amazonian Arc of Deforestation to coupled frontiers. Forest cover is shown on a continuum between black (non-forest) and bright green (100 percent canopy density), meaning that less intense green coloration still denotes woodlands, albeit with less dense canopy cover.


AMAZON RIM
AMAZON RIM
ARC OF DEFORESTATION
MADRE DE DIOS
MATOPIBA
BOLIVIAN LOWLANDS
CHACO
PARAGUAY ATLANTIC FOREST
South America
Forest Loss
2001-2005
Non-forest in 2000
Forest in 2000
Forest loss, 2001-2005
Data: Hansen et al. 2013
0
250 km


AMAZON RIM
AMAZON RIM
ARC OF DEFORESTATION
MADRE DE DIOS
MATOPIBA
BOLIVIAN LOWLANDS
CHACO
PARAGUAY ATLANTIC FOREST
South America
Forest Loss
and Displacement
2001-2014
Non-forest in 2000
Forest in 2000
Forest loss, 2001-2014
Data: Hansen et al. 2013
0
250 km

Displaced Extraction: The Amazon Rim

Displacement of soy expansion from the Brazilian Amazon drives deforestation directly through forest-to-cropland conversions, as well as indirectly through pasture-to-cropland conversions that displace ranching to new forest frontiers such as the Chaco and the Bolivian Amazon. The closing of the Amazon frontier did not just constrict productivist soy expansion; it also constricted extractive expansion by loggers, miners, and extensive ranchers. The reduction in Brazil's Amazonian deforestation has not translated directly into a global reduction in extractive tropical forest conversion, as extractive deforestation has been displaced. Beyond ranching expansion in Paraguay and Bolivia, where deforestation has accelerated concurrently with Amazonian deforestation reductions, the most immediate examples of extractive displacement come from the countries of the extra-Brazilian Amazon, or the 'Amazon Rim,' which in addition to Bolivia includes Peru, Ecuador, Colombia, Venezuela, Guyana, Suriname, and French Guiana.

The Peruvian Amazon in particular has experienced accelerating deforestation due to displaced extraction from Brazil. A harbinger of this displacement occurred in 2001, when the imposition of Brazil's federal mahogany moratorium drove a spike in Peruvian mahogany exports, turning Peru into the world's largest mahogany supplier (Grogan et al. 2010). In 2006-2010, the remaining unpaved portion of the Southern Interoceanic Highway, in the Madre de Dios region of the southern Peruvian Amazon, was paved. This roadway is a continuation of the BR-364 highway in Brazil, whose paving was a central component of the controversial Polonoroeste project in the 1980s. The highway through Madre de Dios connects the Brazilian Amazon and Center West with the Peruvian Andes and Pacific Ocean, and its completion was a central project of the Initiative for the Integration of the Regional Infrastructure of South America (IIRSA), the major South American economic integration initiative launched in 2000. Paving of the Interoceanic Highway

in Peru was financed in large part by BNDES through contracts awarded to the Brazilian construction giant Odebrecht.

The paving of the highway has transformed the Amazonian department of Madre de Dios from a remote backwater into a new frontier of extractive logging and mining and rapid deforestation (Delgado 2008; Southworth et al. 2011; Farias 2016). The road has facilitated migration and the importation of heavy machinery, and spurred by high gold prices after 2007, illegal gold mining has come to dominate frontier dynamics in the region (Scullion et al. 2014). In addition to driving large-scale forest loss, mining is causing severe mercury pollution, which in 2016 led the government to declare a public health emergency (Swenson et al. 2011; Ashe 2012; Daley 2016). Illegal mining is estimated to have increased by 540 percent in 2006-2015, while Peruvian authorities believe that over $1 billion worth of gold was smuggled out of the country in just nine months in 2014 (Daley 2016). Forest loss in Madre de Dios rose from an average of 74 km^2/year in 2001-2005 to 93 km^2/year in 2006-2010, rising more rapidly after the completion of the highway to 147 km^2/year in 2011-2015, a nearly 100 percent increase over the early 2000s (Figure 7.8). National deforestation rates in Peru have also nearly doubled, from an average of 1009 km^2/year in 2001-2005 to 1964 km^2/year in 2011-2015 (Hansen et al. 2013).

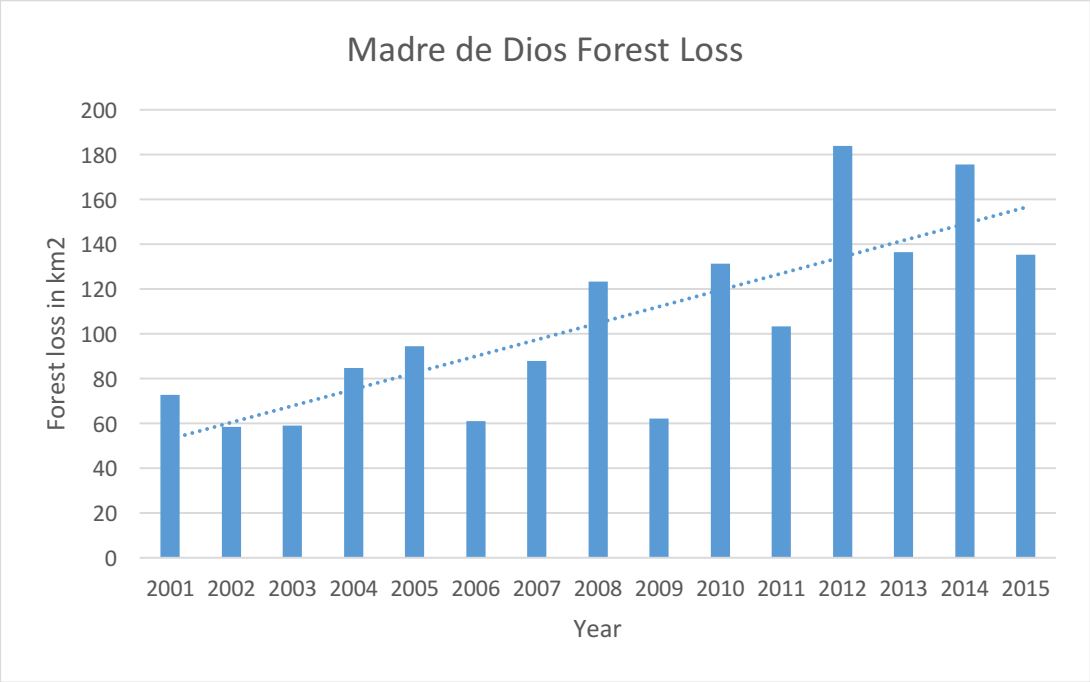


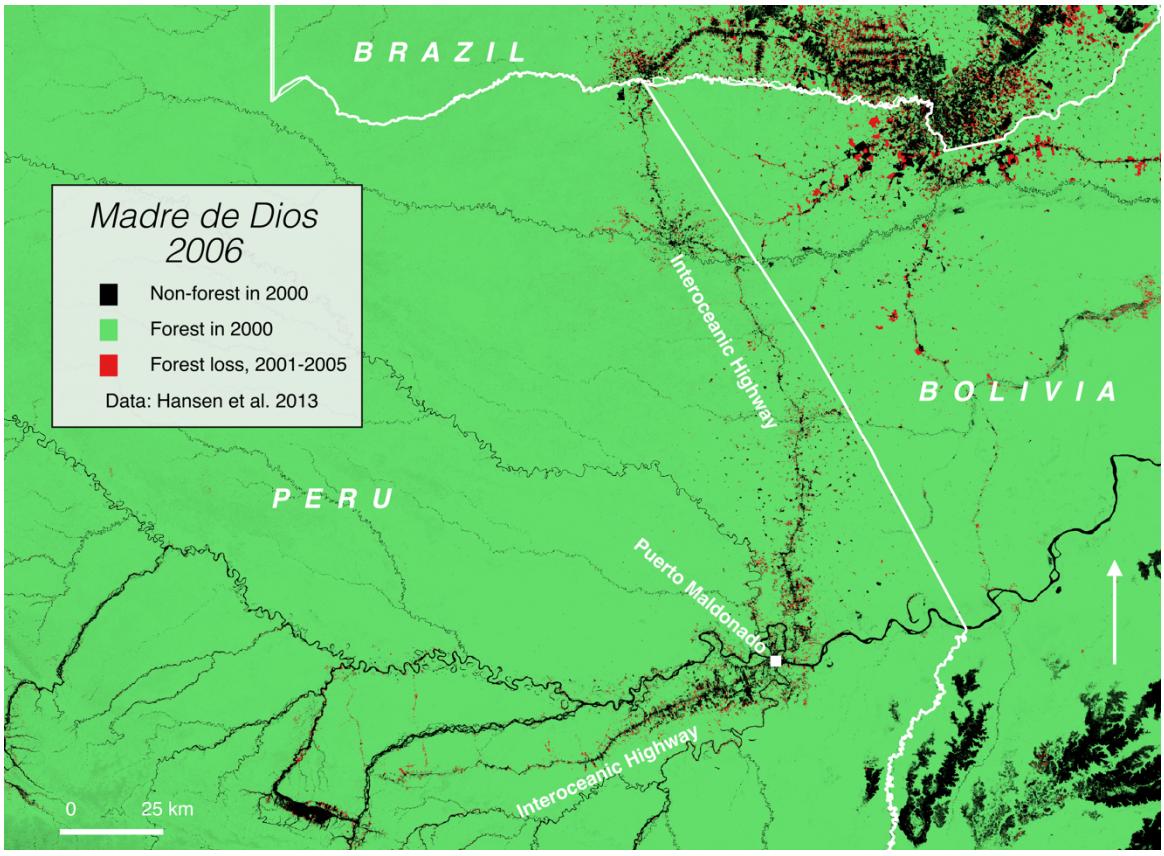
Figure 7.8: Annual forest loss in Madre de Dios, Peru in 2001-2015 at >30 percent canopy density as detected by Global Forest Watch (Hansen et al. 2013).

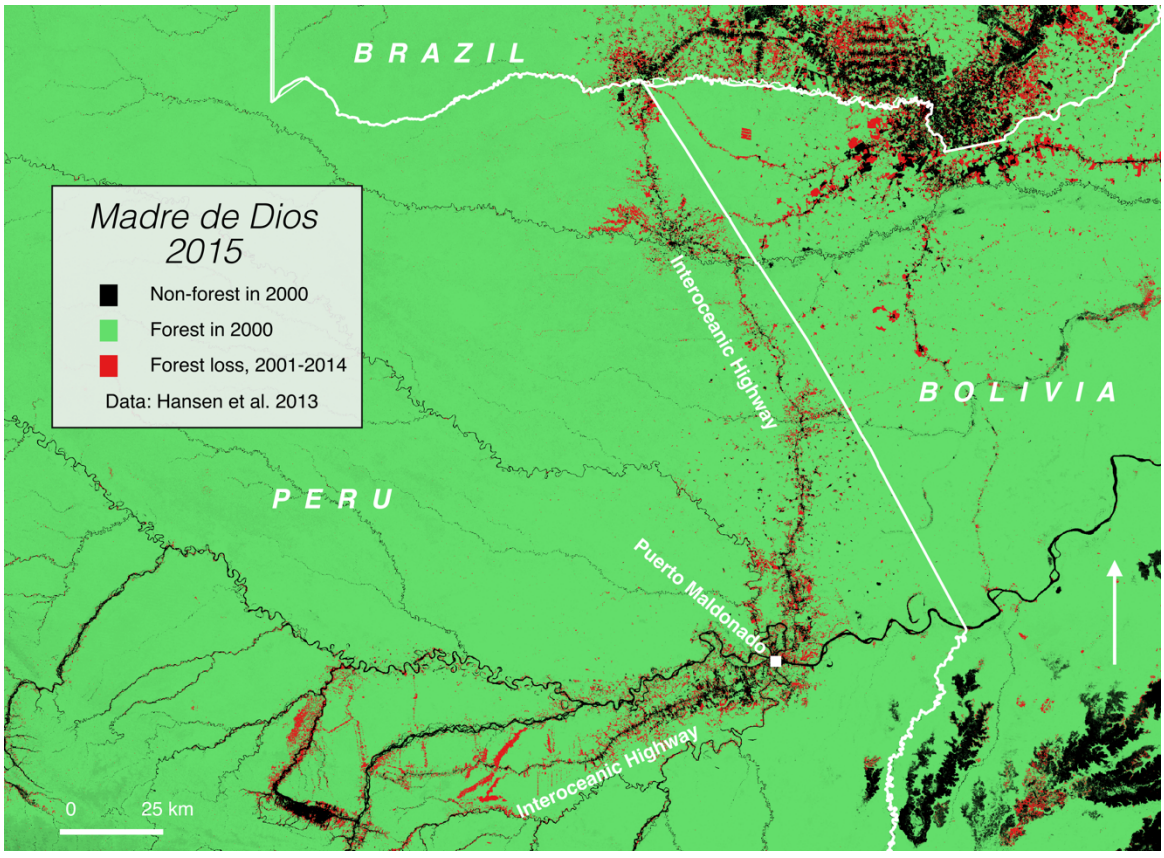
The political economy of Madre de Dios is a typical extractive regime, currently experiencing a boom of accelerated logging, mining, and deforestation. The extractive character of the Peruvian frontier is configured through government complicity and corruption related to illegal logging and mining. The Pyrrhic logic of conservation efforts under this regime, the pervasiveness of extractive accumulation in the region, and the deep integration of extraction and environmental degradation with the global economy are all neatly encapsulated in the account of a reporter who accompanied a raid by Peruvian marines and rangers to dismantle illegal mining operations: "By day's end," she writes, "the raiders had destroyed two dozen encampments and 15 mining derricks, and invaded mining camps far better equipped than their own. Along the way, the soldiers helped themselves, taking home a freezer, a satellite dish, a VCR, a television set, a soccer ball, a black-and-white puppy and a young pig for dinner. At night, you could hear the sounds of the mining derricks starting up again" (Daley 2016). Forests are felled, streams and bodies are

polluted, gold is ripped from the ground, smugglers and officials take their cuts, the wealthy buy gold, and the miners buy TVs.

This extractive frontier in Madre de Dios has been produced by Brazilian capital. BNDES, the very same bank that manages Brazil's Amazon Fund and trumpets its contributions to reducing deforestation and fighting climate change, financed Odebrecht and other Brazilian construction firms to pave the Interoceanic Highway with a project that was initially budgeted at $800 million and over the course of a decade ballooned to over $4 billion (*O Antagonista* 2015; Casey and Zarate 2017). Alejandro Toledo, the president of Peru from 2001 to 2006, is accused of having accepted a $20 million bribe from Odebrecht related to the highway contracts (Leon and Kraul 2017). The company has also been constructing a $7 billion natural gas pipeline in the Peruvian Amazon (Casey and Zarate 2017). In short, at the same time as the Brazilian Government claims to have contributed to the global environment by reducing deforestation in the Brazilian Amazon, it has invested billions of dollars to open a new frontier in Peru that has driven a doubling in Peru's Amazonian deforestation.

Figures 7.9-10: 7.9) Madre de Dios in 2006, showing forest loss in 2001-2005; 7.10) Madre de Dios in 2015, showing forest loss in 2001-2014, demonstrating expanding deforestation following the paving of the Interoceanic Highway in 2006-2010.


BRAZIL
Madre de Dios
2006
Non-forest in 2000
Forest in 2000
Forest loss, 2001-2005
Data: Hansen et al. 2013
Interoceanic Highway
BOLIVIA
PERU
Puerto Maldonado
Interoceanic Highway
0
25 km


BRAZIL
Madre de Dios
2015
Non-forest in 2000
Forest in 2000
Forest loss, 2001-2014
Data: Hansen et al. 2013
Interoceanic Highway
BOLIVIA
PERU
Puerto Maldonado
Interoceanic Highway
0
25 km

Looking across the 5,000 km crescent of the Amazon Rim, deforestation rates in the Amazon regions of Bolivia, Colombia, and Peru increased between 2000 and 2010 (Song et al. 2015), and the Terra-i monitoring system, produced by a partnership including the International Center for Tropical Agriculture (CIAT), The Nature Conservancy, and King's College London, indicates increased aggregate annual deforestation in the Amazon Rim in 2008-2014, as deforestation in the Brazilian Amazon declined (Paz, Reymondin, and Tello 2015). Global Forest Watch data for the eight Amazon Rim countries show average aggregate deforestation of 5977 km^2 per year in 2001-2004, when Brazilian deforestation was at its peak, and an increased deforestation rate of 7937 km^2 per year in 2005-2015, at the same time as Brazilian deforestation declined. An aggregate view of deforestation across the Brazilian Amazon and the major displacement zones of Matopiba, Paraguay, and the Amazon Rim shows that reductions in Brazil's Amazonian deforestation since 2006 have been largely offset by increasing deforestation on closely linked frontiers (Figure 7.11).

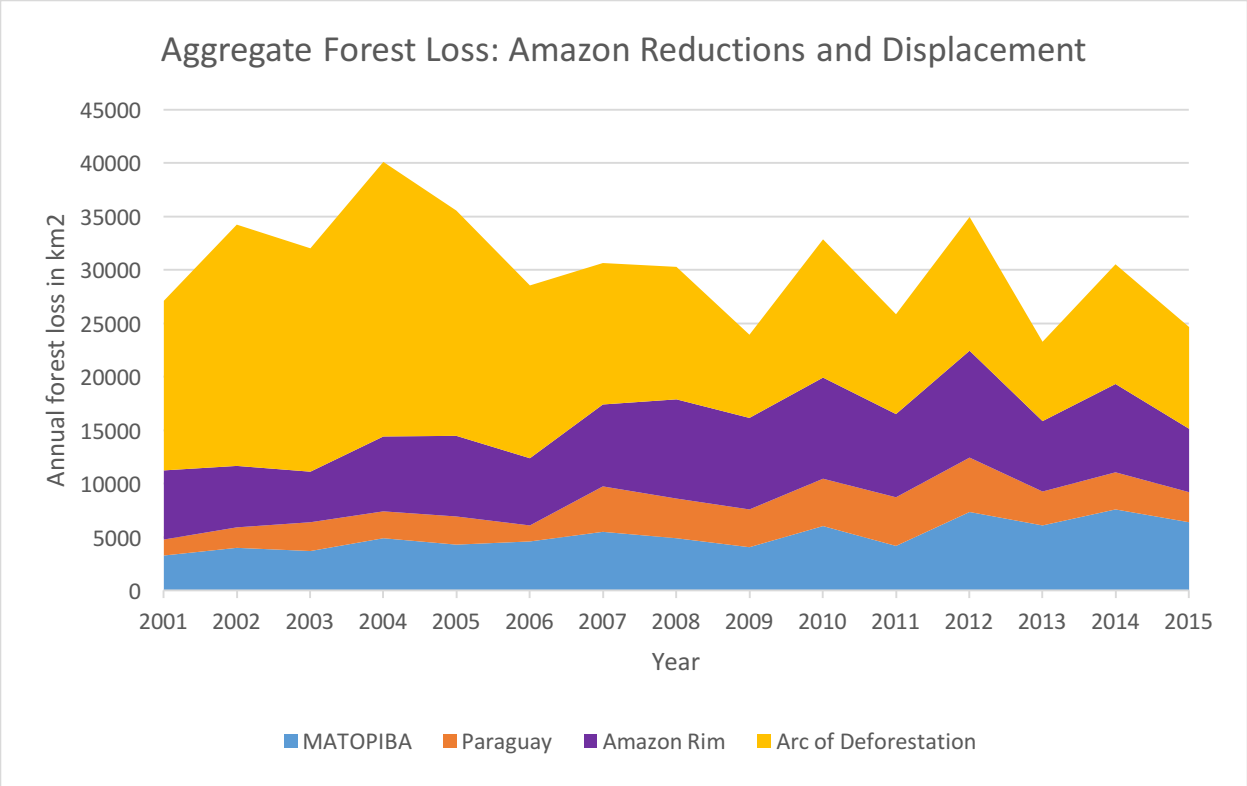


Figure 7.11: Aggregate annual forest loss across the Brazilian Amazon and coupled frontiers, 2001-2015. Reductions in forest loss on Brazil's Arc of Deforestation have been largely offset since 2006 by increasing deforestation on coupled frontiers. The 'Arc of Deforestation' comprises Pará, Mato Grosso, and Rondônia, the three states responsible for 81 percent of deforestation in the Brazilian Amazon since 1988 (INPE 2017). MATOPIBA comprises the entire states of Maranhão, Tocantins, Piauí, and Bahia. The 'Amazon Rim' comprises the entire territories of Bolivia, Colombia, Ecuador, French Guiana, Guyana, Peru, Suriname, and Venezuela. Forest loss for all regions is at >30 percent canopy density as detected by Global Forest Watch (Hansen et al. 2013).

Displaced Deforestation and the Land Sparing Fallacy

Deforestation is a complex socio-ecological process with multiple determinants. There is no one-to-one displacement of hectares spared in Mato Grosso and hectares cleared in Madre de Dios or Matopiba. Rather, my argument identifies regional and aggregate trends and explicates the processes that connect land use change across different regions. This analysis shows that both extractive (logging, extensive ranching) and productivist (soy) expansion in the Brazilian Amazon have been constricted by environmental governance measures, and this constriction has displaced

actors and capital to new frontiers where deforestation has accelerated simultaneously with Amazonian deforestation reductions. There are many factors shaping these new frontiers, including macro-level commodity prices, exchange rate fluctuations, and weather events, and a researcher could attempt to account for these multiple variables and extrapolate multiple counterfactuals to arrive at a numerical estimate of 'leakage' from the Brazilian Amazon to coupled frontiers. While this kind of estimation, in the vein of Meyfroidt and Lambin (2009) and Meyfroidt et al. (2010), is useful for giving an indication of the volume of different material or capital flows, such an exercise necessarily abstracts the actors and processes that construct frontiers from the transnational web through which they emerge and intersect. From the perspective of a geographical political economy of the capitalist world system, the Brazilian Amazon and its displaced frontiers are analytically inseparable. It is clear that without the governance measures of the land sparing complex, soy and ranching would expand massively in the Brazilian Amazon, and it is clear that instead of expanding in the Amazon, the same actors and capital are now expanding in other regions. This phenomenon is displacement. And it is clear, on the aggregate level, that through the web of displacement that is the global economy, while deforestation has declined in the Brazilian Amazon, and in France and Vietnam, aggregate tropical deforestation rates have accelerated.

Oliveira and Hecht, focusing on soy, put their fingers directly on this land sparing conundrum. "How can intensified production limit expansion," they ask, "given the difficulty of 'good governance' across the entire soy frontier of South America, and given that increased production does not aim to satisfy relatively inelastic human food needs, but rather boundless demands for fuels and extremely inefficient but profitable concentrated livestock production?" (2016, 271). Even some scholars who bolster the land sparing discourse acknowledge that

intensification at forest margins for the production of commodities with elastic demand is likely to increase deforestation (Stevenson et al. 2013). When agricultural expansion in the Global South is driven largely by flex crops such as soy and oil palm, coupled in the case of soy with extensive ranching that profits from high cattle prices and land speculation, the demand for deforestation is practically limitless. The key, land sparing advocates argue, is that intensification must be accompanied by 'good governance' that restricts new deforestation. As displacement from the Brazilian Amazon makes clear, however, 'good governance' in one region drives deforestation to areas with weaker regulations and enforcement (le Polain de Waroux et al. 2016). The construction of 'good governance' in the Brazilian Amazon under the land sparing complex, and the (partial) regional transformation from an extractive to a productivist regime are directly coupled with the expansion of extractive regimes in the Paraguayan Chaco and the Bolivian and Peruvian Amazon.

Furthermore, the displacements I have described in this chapter are only the most immediate and easily traceable. I have not considered, for example, displacement through global commodity markets where Brazilian soy and Indonesian oil palm slosh together as fungible vegetable oils and biofuels. I have also focused solely on Brazilian actors and capital, when Brazil is only one among many countries displacing deforestation. Argentinian capital plays a growing role in the Bolivian soy sector (Urioste 2012; Oliveira and Hecht 2016), for example, while forest transitions in China and Europe are supported by imports of soy from across South America (European Commission 2013; Lathuillière et al. 2014; Liu 2014; Muller and Bautze 2017). The national conception of capital is itself a territorial trap, though I have employed it to demonstrate the fallacy of Brazil's land sparing model. One could focus instead on transnational commodity traders such as Cargill, Bunge, and ADM. Cargill and Bunge agreed to the soy moratorium in the Brazilian Amazon and now are some of the largest soy traders in Matopiba and the Bolivian

lowlands (Mighty 2016), while Cargill and ADM are also major traders of Indonesian palm oil. Recent pledges by transnational companies to build 'zero deforestation' supply chains (Climate Focus 2016) ring hollow from a world system perspective. The same displacements that have occurred on the jurisdictional scale will occur on the supply chain scale. Just as ranchers in the Brazilian Amazon launder cattle from illegal ranches through legalized properties, and just as the 'zero deforestation' Brazilian Amazon is coupled with high deforestation frontiers elsewhere, these 'zero deforestation' supply chains are coupled with and fed by frontier expansion.

In the end, when we step back and gaze on the 'blue marble' of planet Earth, we are confronted by an inescapable fact: in 2000-2012, roughly 1,000,000 km^2 of tropical forest were lost worldwide, representing approximately 5 percent of remaining global tropical forest cover. Far from slowing, the rate of tropical forest loss was accelerating by over 2100 km^2 per year (Hansen et al. 2013). Global economic growth remains closely coupled with tropical deforestation, as it has been since the 1970s when the industrial agribusiness and forestry export economies of the Global South grew and consolidated. This present configuration of the tropical agro-industrial commodity frontier is not immutable. The capitalist world system has grown over time through expansion and extraction on practically innumerable frontiers. The contemporary corporate food regime that drives tropical agro-industrial expansion and deforestation shows few signs of restructuring, however, and rather appears to have intensified under the land rush that has emerged from the global financial and ecological crises of the late 2000s (McMichael 2005; McMichael 2012; Thaler 2014).

It is theoretically impossible to separate high-input industrial agriculture from resource extraction and degradation, since the productivity of this agro-ecological system is constituted through a 'metabolic rift' that mines hydrocarbons and minerals, dumps them onto the soil, extracts

nutrients in the form of livestock and crops, and concentrates those nutrients in urban bodies and dead zones of organic waste. Gains in productivity, for example through technological innovation, support expanded consumption and demand expanded extraction. In moments where extraction becomes limited, for example through the exhaustion of fertilizer supplies or through land scarcity, the declining ratio of primitive accumulation leads to declining rates of profit and engenders a crisis of accumulation and the search for new frontiers to re-launch accumulation within revitalized circuits of plunder and productivity (Moore 2000; B. Clark and Foster 2009). Kátia Abreu, a leader of the extractive coalition of *ruralistas* in Brazil,[73] captures this dynamic vividly in a column railing against the constriction of Brazil's agricultural lands. The creation of new protected areas is an "insane steeplechase," she writes, and she likens conditions in Brazil to the territorial limitation of other countries "that, in certain historical circumstances, impelled them to external wars in an effort to increase their dominions" (Abreu 2013). While the ruralistas have not gone to war, they have successfully revised the Forest Code, supported Dilma's impeachment, reduced protected areas such as FLONA Jamanxim, and developed new frontiers of land grabbing and agricultural expansion across South America. Capitalism's green paint job is not holding up very well.

And yet, land sparing discourse has not been abandoned. Instead, it travels along with displaced frontiers. "Our concern is in ensuring that intensive agricultural production takes place within a framework that also provides for sustainable forestry and protection for standing forests," a director general of Bolivia's Forestry and Land Authority blithely claims (Quoted in Tabuchi, Rigby, and White 2017). Visions of modernization support socio-ecological despoliation, to the

[73] Abreu, a former senator and president of the national agricultural federation (CNA), became Minister of Agriculture under Dilma Rousseff's second administration, only to be replaced by Blairo Maggi after Dilma's impeachment.

point where perhaps some forest remnants survive in a sea of soy or oil palm, and newly 'developed' centers such as Santa Cruz begin to displace their deforestation elsewhere, as Europe, the US, and Japan have been doing intensively for half a century, and as Mato Grosso has been doing for a decade. Land sparing supports state building and agro-industrial development, but it delivers at best the "illusion of preservation" (Berlik, Kittredge, and Foster 2002), a forest transition at home and the whine of chainsaws abroad. In his critique of capitalist consumption, Peter Dauvergne laments "the inability of environmental governance to alter, in any fundamental way, the *global* ecological effects of these drivers – such as advertising, economic growth, technology, income inequality, corporations, population growth, and globalization – that together are causing consumption, much of which is wasteful, to rise steadily worldwide. On many measures, policies, actions, and technologies to shape consumption appear to be 'improving' environmental management. But too often the measures are close-up snapshots that cut out a much bigger, more complex, global picture of crisis" (2010, 1–2). These improving close-ups concurrent with a deteriorating global picture comprise the fallacy of composition that lies at the heart of ecological modernization discourse, which conjures a vision of green development only by obscuring the fundamental dialectic of extraction and production that underpins the capitalist world system. Chapter 8 concludes by reflecting on the contributions of this study toward a clearer understanding of the relations between forest governance and global development, and suggesting directions leading away from the extraction-production dialectic.

PART III

CHAPTER 8

CONCLUSION: PYRRHUS AND THE HONEY TREE

> "Pyrrhus replied to one that gave him joy of his victory that one other such [victory] would utterly undo him."
>
> - *Plutarch,* Pyrrhus (75AD [2017])

Solitary trees stand amidst the boundless oceans of oil palm in a young plantation in East Kalimantan. These are 'honey trees,' left standing by the plantation company under an agreement with local villagers, for whom honey is a food and a medicine and honey collection is an important livelihood activity. The surrounding forest is cleared, and replaced by a carpet of African palm that will become shampoo and candy bars. The honey trees survive, but the bees, producers of the honey, now live immersed in the pesticides and fertilizers of the industrial plantation. These chemicals are now passed on to the honey. "It is no longer medicine," a TNC manager tells me, "it becomes poison" (TNC32 150302).

Eleven thousand miles away, in the Brazilian Amazon, lone brazil nut trees (*castanheiras*) rise above expansive cattle pastures. It is illegal to fell a castanheira, so when ranchers clear the forest, they are all that is left standing, cut loose from the canopy and left to wander in the grass. They are spared the chainsaw, but face a similar fate: isolated castanheiras are often virtually barren. The trees are pollinated by several genera of large-bodied bees, which are capable of lifting the petals of the trees' flowers to access their pollen (Almeida 2015, 40). With the destruction of their habitat, the bees disappear. The castanheiras are poisoned, or burned, or struck by lightning. Their charred trunks may one day be pulled from the pastures, along with the stumps of the long-

dead forest, so that the pastures can be turned into fields of soy, to feed the world on a diet of biodiesel and chicken nuggets.

What victory is this, of barren trees and poisoned honey? What victory is the protected forest of Wehea, for the Dayak who live surrounded by mines and oil palm? And what victory even is Brazil's Amazon, if it becomes the last intact forest in the tropics, to one day dry out, burn, and give way to savanna in the widening gyre of a changing climate (Davidson et al. 2012). Such victories as these, and we will be utterly undone.

Figure 8.1: Honey trees in an oil palm plantation in Berau, Indonesia, 18 March 2015.

Figure 8.2: Brazil nut trees stand in cattle pasture in Cotriguaçu, Brazil, 26 June 2014.

Figure 8.3: Unbroken forest in southern Pará, Brazil, 18 July 2014.

This dissertation began with a question, of why, despite similar histories of deforestation and similar efforts at forest conservation, deforestation is declining in Brazil but accelerating in Indonesia. Three different bodies of literature offered elements for an answer. Socio-environmental modernization theories, such as the environmental Kuznets curve, forest transition theory, and ecological modernization theory, suggested that trajectories of deforestation could be explained by socio-economic development. These theories imply that deforestation rates in Indonesia and Brazil have diverged because the countries are passing through different stages on a modernization curve. Political ecology, on the other hand, attends to contestation over access to and use of natural resources, and would suggest that the divergence between deforestation rates in

Brazil and Indonesia can be traced to the differential outcomes of environmental conflicts. Scholarship on multi-level commons governance, lastly, focuses on the role of institutional design in natural resource management, and suggests that different deforestation trends in Brazil and Indonesia could be explained by differences in forest governance institutions.

My research has shown each of these perspectives to be valid, in a way, but also incomplete. The answer, I found, is about development, but not in the way that socio-environmental modernization theories believe. The global political economy develops not along the smooth pathway of modernization, but rather through dialectics of production and extraction, development and underdevelopment, that produce the uneven political-economic geography that defines the capitalist world system. This dialectical systems perspective then integrates the analyses of political ecology and commons governance scholarship. Environmental conflicts and environmental governance institutions emerge within a political-economic order that structures the spaces within which contestation and institutional development occur. To understand why environmental conflicts develop and play out differently, and why institutions work to facilitate different environmental outcomes, one must first understand the political-economic system within which actors and institutions have taken shape.

I used organizational ethnography to follow a common actor through transnational webs of relation, and I leveraged the organizational ethnography to structure an incorporated comparison across distant yet related forest frontiers. Over more than two years of fieldwork stretching from remote forest villages in Borneo and the Amazon to headquarters and convention centers in Washington and Paris, I discovered that land sparing comprises the key organizing principle of global forest governance. I found an explanation for the differential success of land sparing policy in Brazil and Indonesia in the distinction between extractive and productivist political-economic

regimes. As I traced land sparing policy across multiple levels, I came to understand the sociology of neoliberal governance as a hierarchy of regimes, complexes, and coalitions. A regime, in this usage, is a stabilized socio-political order articulated with a mode of production, either extractive or productivist, that organizes a geographically-defined subsystem of the capitalist world system. A complex is an assemblage of actors, institutions, practices, and discourses linked to a specific fraction of capital that seeks to structure accumulation in a particular way. Coalitions are the bridge between a complex and the implementation of policy on the ground. They are the alliances that emerge in specific moments and places to promote different components of a complex's agenda. In Brazil, a land sparing complex has coalesced under a productivist national political-economic regime to attempt to shift the regional political-economic regime of the Amazon from extraction to productivism, while instrumentally driving agro-industrial consolidation at the expense of smallholders. In Indonesia, a land sparing complex comprised primarily of international actors has sought to shift the regional political-economic regime of Kalimantan from extraction to productivism, but this effort has been stymied by the persistence of Indonesia's national, provincial, and district-level extractive regimes that profit from expanding logging, mining, and oil palm and tree fiber plantations. Thus forest governance in Brazil reduces deforestation as part of a political-economic project of agricultural intensification and state-building, while forest governance in Indonesia fails to check accelerating deforestation.

An institutionalist perspective might suggest that the problem of tropical deforestation could therefore be solved if other countries could follow the Brazilian model and shift from extraction to productivism. The key insight of a systems perspective is that extraction and production are dialectical political-economic relations. Incorporated comparison recognizes that Brazil and Indonesia are not independent cases, but connected parts of a world-historical whole.

By looking at the connections between contrasting cases across states or provinces and cross-nationally, I discovered that land sparing and productivist development in the Brazilian Amazon have displaced extractive deforestation elsewhere, most directly to the Cerrado and surrounding countries including Paraguay, Bolivia, and Peru. Productivist development at the global level likewise depends on expanding extraction, such as in Indonesia. While deforestation in the Brazilian Amazon has declined during the past decade, tropical deforestation globally has accelerated. Making Indonesia like Brazil will not reduce global deforestation, because Brazil's land sparing is illusory, highlighting local improvements while ignoring connections to global degradation.

The ability to understand governance and landscape change in distant places as part of a common historical process of agricultural intensification and land use displacement within a capitalist dialectic of extraction and production exemplifies the strengths of incorporated comparison and a dialectical systems perspective. The ethnographic component of this study, meanwhile, cast light on the network of actors involved in the production of tropical forest governance. Through an understanding of how TNC staff see the world and why they act the way they do, I was able to link ideational and material factors for an integrated understanding of forest governance as a historical process. The organizational ethnography helped to highlight how tropical forest governance emerges through shifts in ideas about conservation science in articulation with shifts in environmental and political-economic relations, and it revealed the recursive interactions between experience and policy development.

Existing scholarly accounts of deforestation in Brazil and Indonesia identify important dynamics shaping tropical land use change, but by failing to conceive of tropical deforestation as a world-historical process, they are ultimately partial and insufficient for explaining the Brazil-

Indonesia puzzle, and ill-equipped to theorize the problem of displacement. World systems analysis has often been criticized for its structural determinism and economic reductionism (e.g., Skocpol 1977), and many applications of world systems analysis have doubtless presented an overly static and monochromatic image of the capitalist political economy. I maintain that efforts to understand macro-level socio-ecological change through a handful of abstracted variables or reified tendencies (GDP per capita, social mobilization, 'good governance') fall also into a reductionism and determinism that ignores the relational webs and historical processes through which globalized phenomena emerge. By working across multiple levels and diverse landscapes, I have sought to offer a variegated picture of socio-ecological change, where global projects are contested and remade and political-economic regimes are not immutable, but subject to transformation through confluences of structure and agency.

Beyond its empirical findings on forest governance and tropical land use change, this study speaks to the perennial puzzle of when and why productivist development occurs. While institutions that provide for constraints on government expropriation, an independent judiciary, and property rights enforcement comprise a critical background for capitalist productivism (Acemoglu, Johnson, and Robinson 2001), the experience of the Brazilian Amazon bolsters both the literature on developmental states, which emphasizes state agency in territorialization and the facilitation of capital investment, and the literature in economic geography, which highlights the influence of location rents and agglomeration economies. To the degree that the Brazilian state seeks to catalyze productivist development in areas isolated from current frontiers of productivist expansion, such as São Félix or Cotriguaçu, it must do so with higher levels of investment, whereas in areas adjacent to expanding productivist centers, such as Nova Ubiratã and Novo Progresso, intensification occurs without extraordinary state investments (though always with the state as a

partner to capital). Only strong governance by the state will prevent intensification in productivist centers from driving additional local deforestation, however. In Indonesia, it would be entirely possible for a 'multidimensional conspiracy for development' (Hirschman 1977) to emerge that would guarantee productivist institutions and facilitate capital investment. There were elements of Sukarno's post-independence program that aimed to shift Indonesia away from its extractive regime, yet Suharto overthrew Sukarno and reinforced extraction, and productivist coalitions have yet to gain the upper hand. If Indonesia does undergo a productivist transition, then it will begin to displace extraction to new peripheries, just as a transitioning China has displaced extraction to Indonesia (Lang and Chan 2006; Liu 2014).

In the broadest terms, I have sought to advance a dialectical systems research framework that integrates governance, development, and environmental change in a fully transnational perspective. At a theoretical level, this study demonstrates the utility of a framework of regimes, complexes, and coalitions for analyzing the sociology of capitalism, especially in the neoliberal era. This conceptual structure is more specific and systematic than concepts of 'assemblages' and 'development coalitions,' as it situates actors and policies in relation to multilevel dynamics of political-economic transformation. It also serves to locate the state within the transnational authority structures of neoliberal governance. The discussion of displacement, meanwhile, demonstrates the importance of an attention to telecouplings, though always situated within the broader socio-ecological web through which they are produced.

At a methodological level, incorporated comparison proved to be an effective approach to studying globalized phenomena, but selection of incorporated cases for this study depended on transnational organizational ethnography to drive the case selection and render visible the connections among the cases. Transnational organizational ethnography thus served to produce a

three-dimensional picture of transnational webs of relation, as well as to illuminate the epistemic dynamics of global change. This organizational approach addressed some of the challenges of global ethnography by defining the ethnographic 'field' and facilitating access to diverse and distant places. While this dissertation used organizational ethnography instrumentally for a study of tropical deforestation, a companion project will focus on my ethnography of The Nature Conservancy in its own right.

Now from the vantage of the tropical forest conservation programs of The Nature Conservancy; of East Kutai, Berau, Nova Ubiratã, Cotriguaçu, São Félix, and Novo Progresso; of East Kalimantan, Mato Grosso, and Pará; of Brazil and Indonesia and their transnational couplings, what can we say of forest governance and global development? Why does the land sparing fallacy survive, when it produces ever-expanding environmental degradation?

The land sparing hypothesis is presented as a scientific proposition, but land sparing, like ecological modernization, is also a discourse. Land sparing discourse knits together a complex of state, agro-industrial, and environmentalist actors through a narrative that reconciles the interests of each group: in territorialization, in agricultural intensification, in forest conservation. It is a component of the broader ecological modernization discourse that holds that there is no necessary contradiction between profitable business, environmental protection, and community development.

In 2010, Bank of America Merrill Lynch announced a $300,000 grant to TNC's Berau Forest Carbon Program. Agus Purnomo, head of Indonesia's National Council on Climate Change, is quoted celebrating the grant in a Bank of America press release: "Boosting Indonesia's economy and meeting its development objectives while simultaneously tackling the threats of climate change requires a new kind of economic planning and decision-making. Meeting these objectives

will not be easy. Yet these multiple objectives can and must be met. Success will require a joint effort and contribution of government, civil society, businesses and local communities at all levels" (Bank of America 2010). Of course, this harmonious vision of multi-stakeholder collaboration and compatible objectives fails to mention that Bank of America Merrill Lynch has made over $100 million in profits from investments and financing for Berau Coal. With $100 million of dirty money and $300,000 in indulgences, there is little doubt that economic growth will come at the cost of people and the environment. Such win-wins as these, and we will be utterly undone.

The myth of ecological modernization has become the hegemonic discourse of the productivist core, and to people living in the United States, or Europe, or Japan, who see returning forests and improving environmental conditions accompanying their prosperity, ecological modernization is apparently plausible. This discourse wrecks, however, against the bald degradation of extraction. From the periphery, these appeals to infinite compatibility are manifestly false, but they are deployed nonetheless by the green growth complex, with 'cynical reason,' to coopt opposing forces and preserve the ideological underpinnings of exploitative and destructive capitalist growth.

Socio-environmental modernization theories, like the environmental Kuznets curve, forest transition theory, and ecological modernization, have a fundamental flaw, which is demonstrated in this study by the land sparing fallacy: they blind themselves to questions of scale, choosing to highlight local improvements while ignoring their systemic relationships to global degradation. Forest transitions and productivist development in the Global North have depended on the displacement of extractive deforestation to Brazil and Indonesia, and deforestation reductions and agricultural intensification in the Brazilian Amazon depend on the displacement of extraction and agricultural expansion to new frontiers of deforestation.

If the closure of one frontier simply displaces agricultural expansion and deforestation elsewhere, and productivist transitions, to the degree they occur, depend on extraction, then what is the solution if we care about tropical forests, and more broadly if we care about ecological integrity, diversity, and human well-being? In some ways, this is the easiest question of the dissertation, because it has an abundance of ready answers. There are myriad ways to live that do not require eating meat every day, shipping flex crops around the world, consuming always more and cheaper and faster, living alienated from the land and the species we depend on for subsistence. There is degrowth and social ecology and bioregionalism and eco-feminism. There are ecovillages and community-supported agriculture and Via Campesina and the Landless Workers' Movement. There are numerous indigenous and traditional ways of being that still resist the genocidal expansion of global capitalism.[74] The apotheosis of capitalist hegemony is the illusion that no other world is possible. Before we can open our world to these alternatives, however, we must first put an end to the cynical and Pyrrhic reasons that justify social and ecological degradation. We must abandon the myth of ecological modernization – the fallacies that intensive agriculture spares land for nature, forests will return with global development, and capitalism can one day be green.

[74] The United Nations (2009) estimates that the world's 370 million surviving indigenous people represent 5000 different indigenous cultures. For some discussions of indigenous ways of being and knowing, see Henry and Pene (2001), Poirier (2008), De La Cadena (2010), Cameron et al. (2014), and Blaser (2014). For some discussions of the genocide of indigenous peoples as integral to the development of global capitalism, see Evans and Thorpe (2001), Tatz (2003), and especially Wolfe (2006).

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